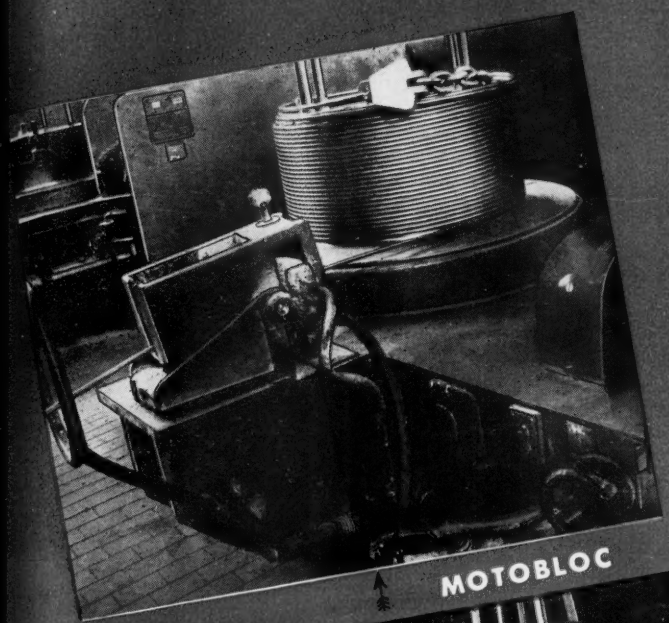
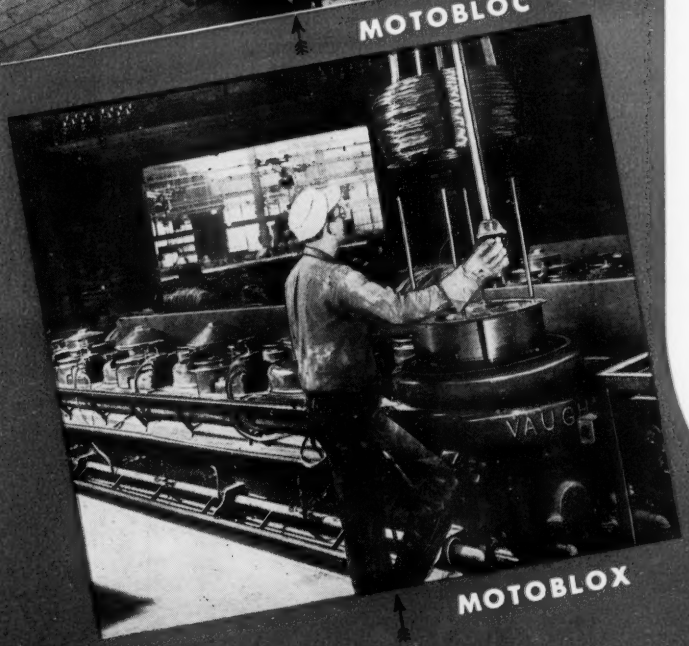
WIRE AND WIRE PRODUCTS

APRIL 1948





Vaughn

helps you cut costs...

with higher efficiency in Wire Drawing operations

The smooth dependability of Vaughn MOTOBLOC . . . the fast, continuous performance of Vaughn MOTOBLOX . . . are based on specialized engineering and manufacture which assure maximum wire drawing performance at minimum operating cost. We'll be glad to discuss your requirements, at any time.

THE VAUGHN MACHINERY COMPANY

CUYAHOGA FALLS, OHIO, U. S. A.

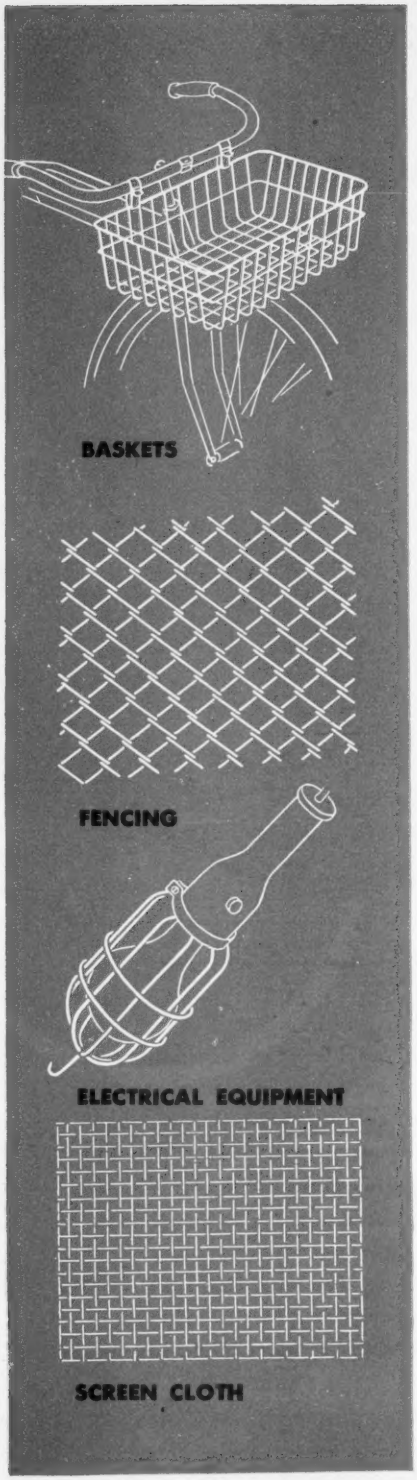
COMPLETE COLD DRAWING EQUIPMENT—Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

"Quick on the Draw!"
VAUGHN MACHINERY
PROFITABLY USED BY LEADING WIRE MILLS SINCE 1871

OFFICIAL PUBLICATION OF THE WIRE ASSOCIATION

The Atlantic Steel Co. of Atlanta, Georgia, has just installed this Wilson 74" furnace for heavy tonnage process annealing.

this Wilson 74" furnace for heavy tonnage process annealing.



To keep customers from seeing RED

.. make woven wire goods from

ALCOA ALUMINUM WIRE

Your customers will never see red rust on articles made from Alcoa Aluminum Wire. No need for protective plating or painting to keep aluminum wire attractive. You save on finishing . . . the customer never needs to replate or repaint.

You save, too, because there are three times as many feet of wire in a pound of aluminum as in a pound of brass or steel. And the customer likes the lighter weight of aluminum.

Alcoa Aluminum Wire is made in a variety of alloys and tempers, in all standard shapes and gages to meet your requirements. ALUMINUM COMPANY OF AMERICA, 1828 Gulf Bldg., Pittsburgh 19, Pa. Sales offices in 54 leading cities.

ALCOA FIRST IN ALUMINUM

ALCOA ALUMINUM 1888 1948 60 YEARS OF SERVICE

For severe fabrication for corrosion-resistance

Bethanized wire has a ductile coating of pure zinc. It can be bent severely, twisted around its own diameter, even drawn to fine gauge without cracking or peeling of the zinc coating.

Do you need zinc-coated wire with a highly-ductile coating? Or one that will resist severe corrosion? Bethanized wire is the answer to *both* requirements.

Bethanized wire is coated with pure zinc (99.9 pct pure) by an electrolytic process which deposits on the wire a uniform coating to almost any desired thickness. The bond between steel and zinc is so tight that the bethanized coating takes the most difficult forming or fabricating operations without cracking, flaking, or peeling. In fact, bethanized wire can be bent flat on itself, wrapped around its own diameter—even drawn through dies to fine gauge—and the ductile zinc coating remains undamaged.

The bethanized coating locks out corrosion so effectively because of the purity of the zinc and the uniform thickness of the coating both around and along the wire. In addition to providing extra protection in normal service, the bethanized coating is available for exceptionally severe corrosive conditions in weights up to three times as heavy as those called for in conventional Type 3 galvanizing.

Perhaps bethanized wire is the answer to one of your production jobs. Naturally we'll be glad to cooperate in every way possible. There's a Bethlehem district office near you.

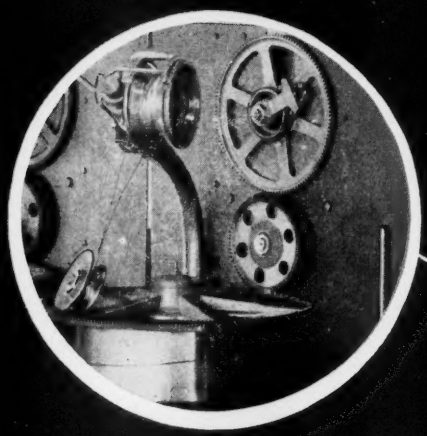
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

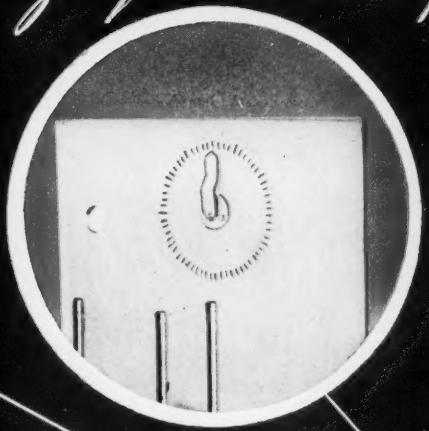
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

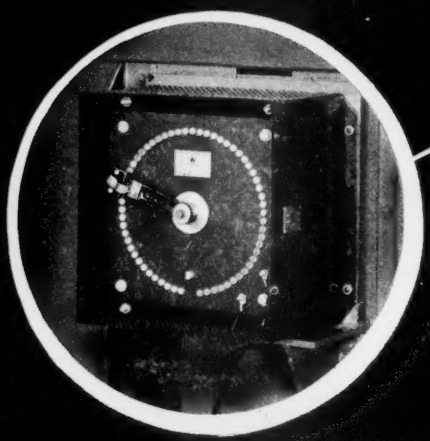
★ Bethanized Wire ★ BETHLEHEM STEEL ★

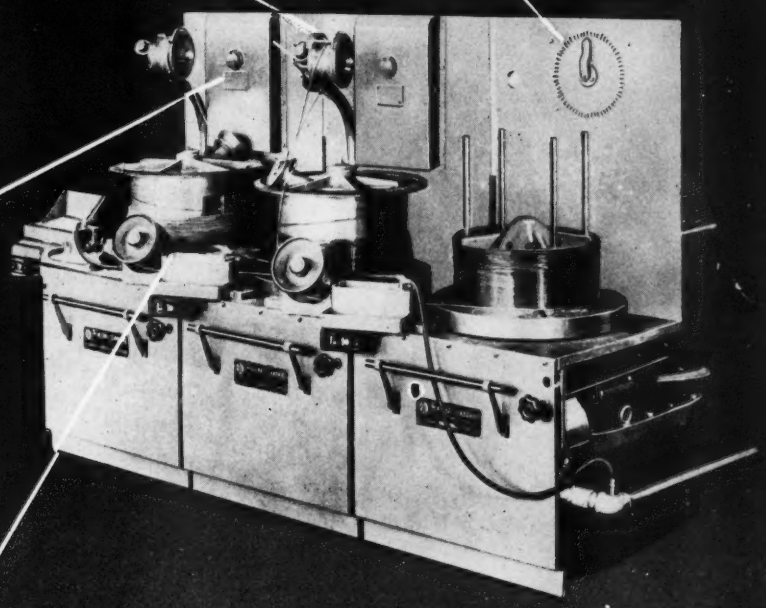
WIRE & WIRE PRODUCTS, Vol. 23, No. 4, April, 1948. Publication Office, at 61 Cliff Street, New York 7, N. Y. Executive Office, 300 Main Street, Stamford, Conn. Published monthly by the Quinn-Brown Corp., Richard E. Brown, President; R. S. Spengel, Secy. and Treas. Subscription price: U. S., $5.00; Canada, $5.00 per year; 50 cents per copy; Foreign, $7.50 per year. Entered as second class matter, June 14, 1946, at the Post Office, New York, N. Y., under Act of March 3, 1879.

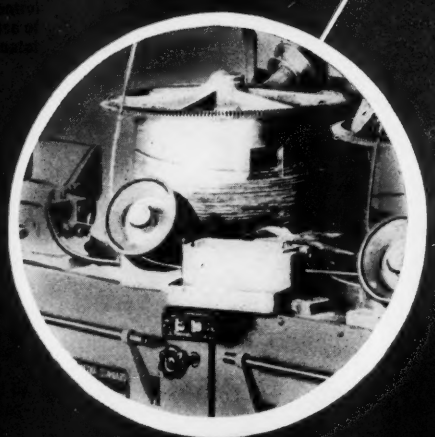
Auto-rheostatic synchronizing control system











Heart of the automatic operation of two or more Aetna Units in tandem, centers in the auto-rheostatic synchronizing control, which automatically synchronizes block speeds to compensate for the elongation of the wire through successive drawing dies.

It is easy to operate. Once threaded, the Units will run automatically and continuously as long as a continuous strand of rod or wire is being supplied

Chase can supply you
...WITH BRASS, COPPER, BRONZE PRODUCTS FROM STOCK!
WANT prompt delivery of brass and copper sheet, rod, wire, or tube? Or brass and bronze nuts and bolts, copper rivets and burs—a myriad of miscellaneous items? Try your local Chase warehouse.
There are 22 warehouses ready to serve you. Ready to fill your orders immediately, ready to place *big* orders directly with the mill for *prompt delivery!*
It's the easy way to obtain mill products—or almost anything in brass, copper, bronze.

Chase

the Nation's Headquarters for
BRASS & COPPER

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THIS IS THE CHASE NETWORK . . . *handiest way to buy brass*

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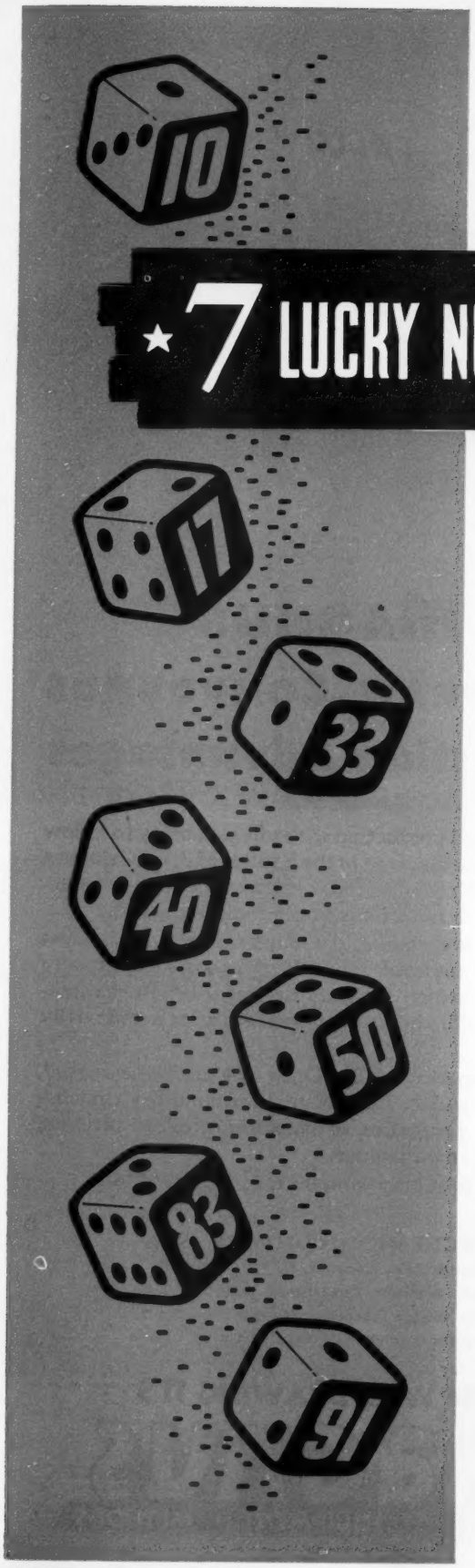

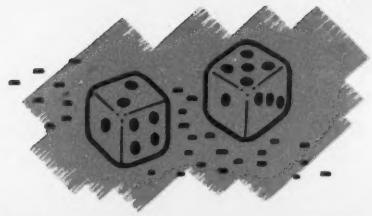

★7 LUCKY NUMBERS FOR FASTER, BETTER WIRE DRAWING

● Like to "gamble" on a sure thing? You can depend on Standard wire drawing compounds to "pay out" every time! Mill-tested for top performance, these special-purpose compounds will produce the finish you require on all grades of steel, copper or brass: — lime bright, extra bright, dull-coated; or special finishes for welding, enamelling and plating. Leading wire producers have found these Standard formulas "time-trouble-and-money-savers" . . .

#10-17 — for galvanized and all other wet wire drawing; #33 — for extra bright finish on 1 and 2 hole wire; #40 — for general wire drawing; #50 — for hard finish on spring wire; #83 — for cold heading; #91 — for regular wire finish, nails, or rod breakdown on high or low carbon. Whatever your requirements, you're sure to be time and money ahead with Standard! Got a special problem? A note to our Technical Department will bring you some quick and workable answers!

WIRE DRAWING LUBRICANTS

Standard

INDUSTRIAL COMPOUNDS CO.

4600 WEST FERDINAND STREET

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REAL FOLLOW THROUGH
TENACIOUS FILMS
EXCELLENT SLIP
EASY ON THE DIES

MAGNUS
DRI-DRAW COMPOUNDS
Give You These Production Advantages

DESIGNED for high speed production with unique ability to follow the metal through the die, even in the hardest of draws, Magnus Dri-Draw Compounds offer you material improvements in production along with worthwhile reductions in die replacements.

On difficult draws on low carbon, and on high carbon and stainless wire, Dri-Draw #4 is of unusual value. It gives an exceptionally tough and tenacious film which not only insures a bright, scratch-free finish, but adds to die life on draws where die wear is ordinarily the greatest.

Where the special properties of Dri-Draw #4 are not essential, Magnus Dri-Draw #6 is widely used as an all-around dry drawing compound with similar properties of consistent follow through, adequate slip and effective adherence.

We shall be very glad to supply samples for plant scale tests.

Metal Coat #267 Eliminates Liming

There's no liming or baking when you use Metal Coat #267, yet you get far superior results at a much lower over-all cost per ton of wire drawn. It will pay to look into this outstanding compound.

MAGNUS CHEMICAL COMPANY
188 South Ave., Garwood, N. J.
IN CANADA – MAGNUS CHEMICALS, LTD.
4040 Rue Masson, Montreal 36, Que.
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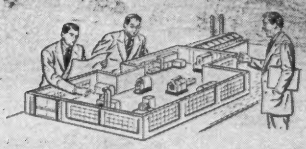
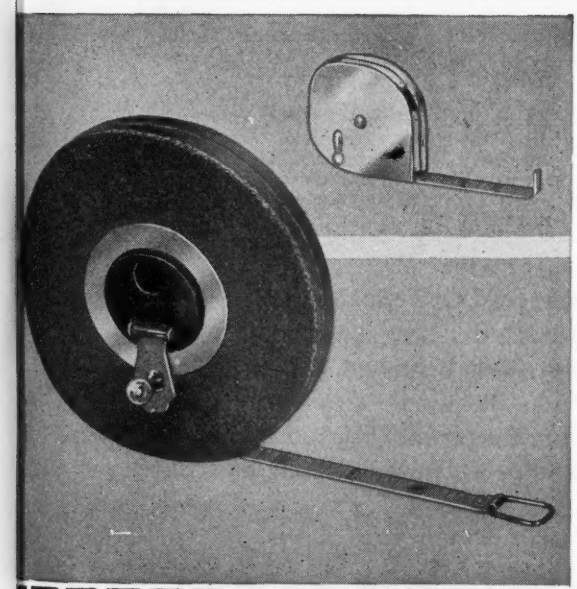
IN WIRE DRAWING IT'S
Magnus
CLEANERS • EQUIPMENT • METHODS

Confidence- WITH ITS SLEEVES ROLLED UP!





STRAIGHT AND STALWART, every factory stack is a towering symbol of man's faith in the future... industry's confidence in its ability to create and to expand production for better living and a richer world.

With confidence like that, Roebling has pioneered in developing and making an extraordinary range of products indispensable to industry. And the confidence that its products and engineering skill have earned in every industrial field is one of Roebling's most valued assets. Every Roebling employee is striving to safeguard that confidence by making products and rendering services that are of maximum utility to you.

MEASURE THIS FLAT WIRE BY ANY STANDARD

SIZE UP ROEBLING FLAT WIRE... its steel analysis, dimensional uniformity, temper, finish. You'll find it's *right* on every count . . . meets specifications and helps beat mounting production costs.

Roebling looks out for you by controlling each step in the manufacture of its flat wire . . . makes its own steel to assure the right metal composition . . . produces wire by means of modern, highly specialized equipment and techniques . . . constantly applies the results of research and development to give you the finest flat wire that can be made.

Specify Roebling Flat Wire with confidence that it will meet your requirements. Your Roebling Field man will help you determine the *right* wire for the job, and the right way of handling it. Write or call your nearest Roebling branch office.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON 2, NEW JERSEY
Branches and Warehouses in Principal Cities

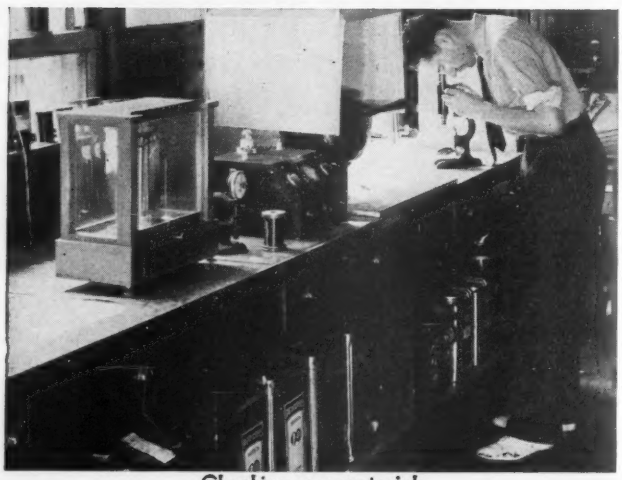
A CENTURY OF CONFIDENCE **ROEBLING**

JAR ROEBLING

★ WIRE ROPE AND STRAND ★ FITTINGS ★ SLINGS ★ SUSPENSION BRIDGES AND CABLES ★ AIRCORD, AIRCORD TERMINALS AND AIR CONTROLS ★ AERIAL WIRE ROPE SYSTEMS ★ ELECTRICAL WIRE AND CABLE ★ SKI LIFTS ★ HARD, ANNEALED OR TEMPERED HIGH AND LOW CARBON FINE AND SPECIALTY WIRE, FLAT WIRE, COLD ROLLED STRIP AND COLD ROLLED SPRING STEEL ★ SCREEN, HARDWARE AND INDUSTRIAL WIRE CLOTH ★ LAWN MOWERS

Custom built spools for high speed winding

Mercury testing for continuity of film



Checking raw materials

Don't "fool around"... USE DEPENDABLE WIRE PRODUCTS!

A product, too, is only as strong as its weakest part. Follow the practice of leading designers and engineers by specifying only service-giving wire . . . wire that has built up a reputation for "delivering the goods under fire."

Hudson Wire products, designed for discriminating manufacturers, has just such a reputation in the fine wire field. Offering greater flexibility and tensile strength, perfect laying at higher speeds, new coating methods and reduced coil dimensions without sacrificing electrical values, Hudson Wire products will probably lower your production costs considerably. Check these three points:

QUALITY — All phases of manufacture, from ingot to final processing, are carefully supervised and fulfilled in the same manner you would carry out in your own plant. There are no unimportant phases in the work.

UNIFORMITY — By mercury process tests, our engineers can guarantee perfect uniformity in wire; from the smallest to the largest order. No more variations in consistency, structure or electrical properties . . . every inch of wire exactly as specified, more than meeting your requirements.

SERVICE — If you have a wire problem, our complete design and engineering facilities are at your disposal without obligation. Send your specifications and blueprints for our recommendations; or if you are not quite ready, write for samples of these quality products.

Enameled Copper, Enameled Iron, Enameled Alloy, Enameled Aluminum, Silk Covered, Cotton Covered, Celanese Covered, Glass Fibre Covered, Twisted Multiples, Parallel Multiples, and Litzendraht

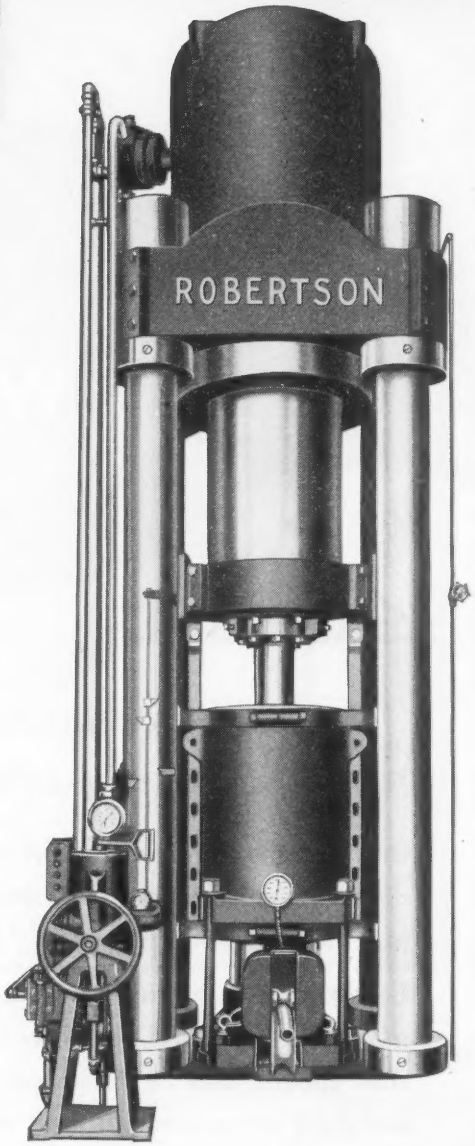
HUDSON WIRE CO.

Winsted Division

WINSTED CONNECTICUT

LEAD ENCASING PRESS *by* ROBERTSON

UNIFORM STEADY OUTPUT!

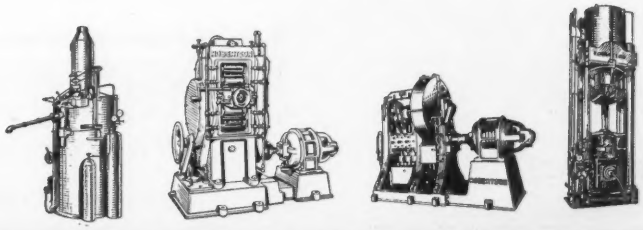


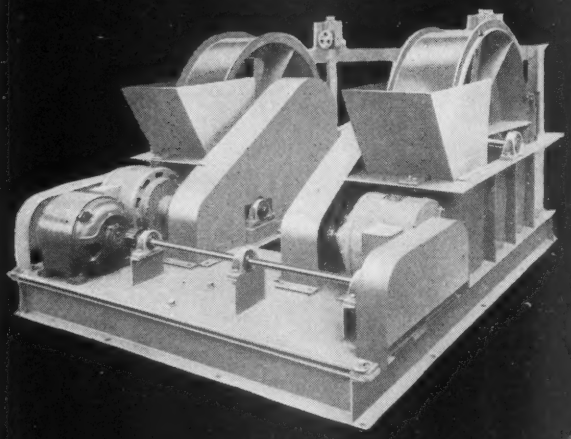
Yes, and low operating and maintenance costs, too—because Robertson Lead Encasing Presses are practically "custom-built" to fit your specific requirements.

Our more than 89 years of specialized experience in the design and manufacture of high pressure hydraulic equipment is at your service to help you solve your lead encasing problems. Consult us.

We also design and build Extrusion Presses, Hydraulic Pumps, Melting Furnaces and Pots, Dies and Cores, Lead Sheath Stripping Machines and Hydraulic Equipment for Special Uses. Write for details.

JOHN Robertson
COMPANY INCORPORATED
125-137 WATER STREET, BROOKLYN 1, NEW YORK
Designers and Builders of all Types of Lead Encasing Machinery
Since 1858





NEW!
SYNCRO
TWIN WATER COOLED CAPSTANS

SYNCRO

Especially designed as pulling devices to handle weatherproof wire during saturating process

Unit permits the operation of two lines of wire simultaneously. The twin 38″ dia. x 12″ face tapered capstans are suspended to rotate partially submerged in water for cooling.

Capstans are powered from a common drive but each is driven through its own magnetic slip clutch to allow independent tension control. Variation of capstan speeds can be provided, if desired. Electrically heated dieholders are standard for accommodating wiping dies with openings as large as .400″ dia.

There's a complete line of machinery for the Wire Industry

Designed — Engineered — Built By

SYNCRO MACHINE COMPANY

611 Sayre Avenue **Perth Amboy, N. J.**

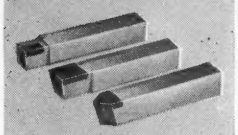
Affiliated Company

Winget-Syncro, Rochester, Kent, England

1 POUND to 1000 POUNDS

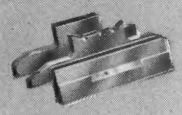
Talide
(TUNGSTEN CARBIDE)
Work Rolls

TALIDE METAL MEETS EVERY REQUIREMENT



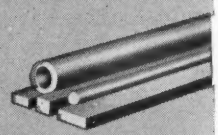
CUTTING TOOLS

DRAWING DIES

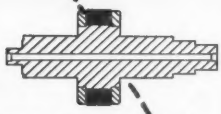


CENTERLESS BLADES

DRILL JIG BUSHINGS



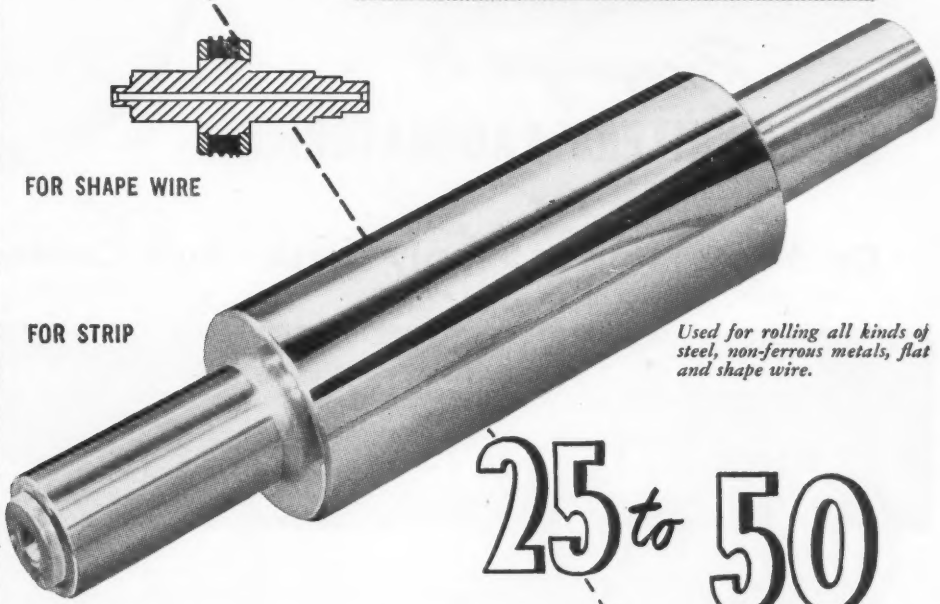
SOLID BAR STOCK



FOR FLAT WIRE

FOR SHAPE WIRE

FOR STRIP



Used for rolling all kinds of steel, non-ferrous metals, flat and shape wire.

25 to 50
times more work per grind

This solid tungsten carbide (Talide Metal) roll is the largest product ever made of tungsten carbide. Solid or sleeved, carbide rolls are an exclusive development of Metal Carbides Corporation . . . diameters up to 10" and lengths up to 40". Much harder than the hardest steel rolls, carbide rolls take and impart a mirror-like finish to the metal rolled. On production, mills report 25 to 50 times more service life per grind.

OTHER ADVANTAGES INCLUDE:

MORE PRODUCTION	CLOSER TOLERANCES
HIGHER SPEEDS	GREATER REDUCTIONS
LESS DOWN TIME	FEWER REJECTS

Carbide rolls can be reground twice as many times as steel rolls. Improved physical properties of the strip reduce cost of subsequent plating and stamping operations.

Send for Circular on TALIDE ROLLS

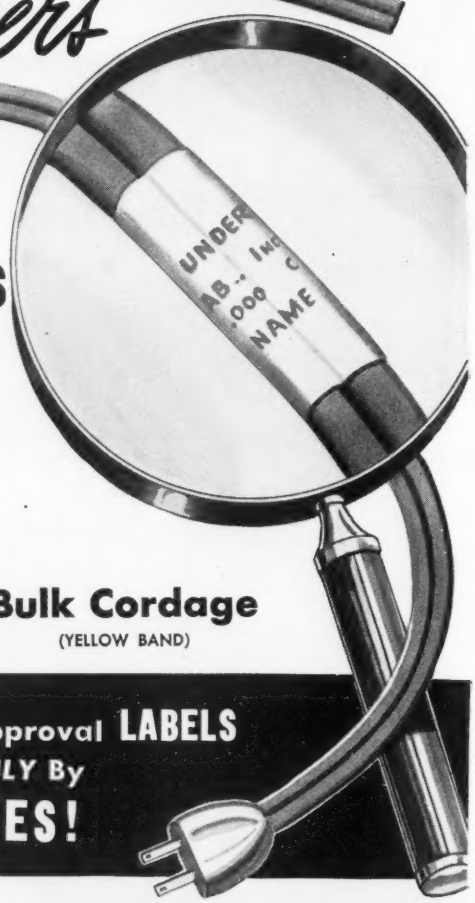
SINTERED CARBIDES — MC TALIDE — HOT PRESSED CARBIDES

METAL CARBIDES CORPORATION

YOUNGSTOWN 5, OHIO *Pioneers in Tungsten Carbide Metallurgy*

CUTTING TOOLS . DRAWING DIES . WEAR RESISTANT PARTS

Wire Manufacturers



PRESSURE SENSITIVE
UNDERWRITERS' APPROVAL LABELS
ARE NOW
Recognized by
UNDERWRITERS' LABORATORIES
For
Cord Sets · Power Supply Cords · Bulk Cordage
(BLUE BAND) (GREEN BAND) (YELLOW BAND)

PRESSURE SENSITIVE Underwriters' Approval LABELS
Are Applied Automatically *ONLY* By
JLE LABELLING MACHINES!

JLE Type A Machine for Bulk Cord Labelling
JLE Type AC Machine for Cord Set and Power Supply Cord Labelling

Now you can AUTOMATICALLY apply *preferred Pressure Sensitive* Underwriters' Approval labels to Cord Sets and Power Supply Cords simultaneously with cutting and stripping operations, placing one label on each Cord Set or Power Supply Cord at *any designated position* with JLE Type AC Labelling Machine. Of course you can also automatically apply Pressure Sensitive labels every five feet on bulk cordage with the JLE Type A Machines.

FULL PAGE ANNOUNCEMENTS OF THE UNDERWRITERS' RECOGNIZED *PRESSURE SENSITIVE* LABELS ARE BEING MADE TO RADIO and TELEVISION, LAMP AND GENERAL ELECTRICAL APPLIANCE MANUFACTURERS IN ELECTRICAL MANUFACTURING — ELECTRICAL MERCHANDISING and ELECTRONICS in APRIL and MAY ISSUES!

Complete details on JLE labelling machines and the Pressure Sensitive Labelling Plan are available on request. Quotations supplied promptly.

JAMES L. ENTWISTLE CO.
43 CHURCH STREET, PAWTUCKET, RHODE ISLAND
World's Leading Manufacturer of Spark-Testing Equipment
30 YEARS OF SERVICE TO THE WIRE INDUSTRY

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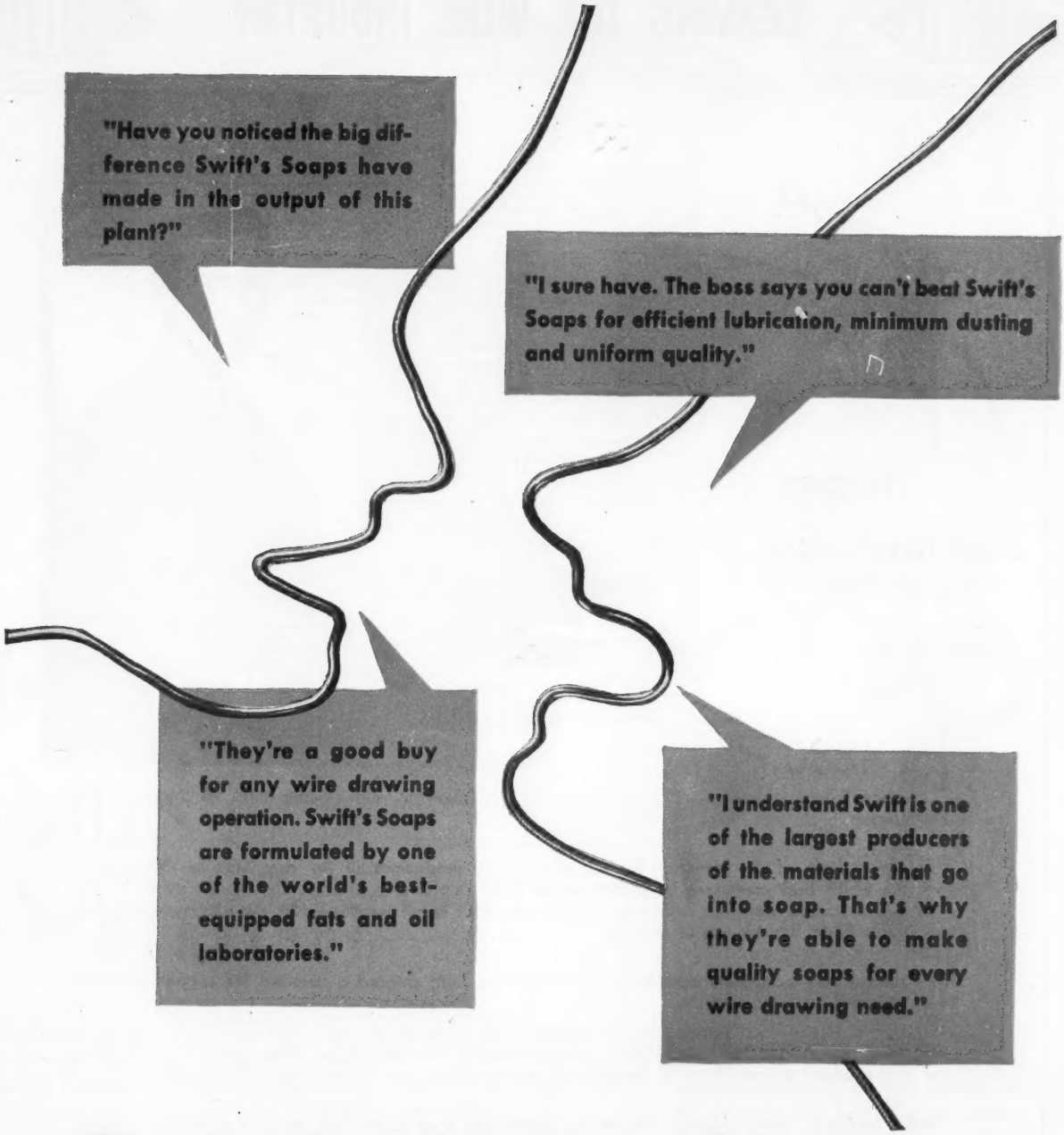
JLE


"Have you noticed the big difference Swift's Soaps have made in the output of this plant?"
"I sure have. The boss says you can't beat Swift's Soaps for efficient lubrication, minimum dusting and uniform quality."
"They're a good buy for any wire drawing operation. Swift's Soaps are formulated by one of the world's best-equipped fats and oil laboratories."
"I understand Swift is one of the largest producers of the materials that go into soap. That's why they're able to make quality soaps for every wire drawing need."

There's a Swift Distribution Point near you

Swift's Soaps

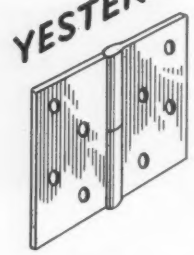
for every wire drawing operation

Powdered White Ribbon
Guaranteed Powder
Snap Heavy Duty
Wire Drawing Powder No. 282
No. 559 Powdered Soap

In barrels and bags

SWIFT & COMPANY
Soap Department, Chicago 9, Ill.

SERVING THE WIRE INDUSTRY



TODAY

WE HELP LIGHT
THE WORLD

IN 1880 —

Thomas Edison staged the first successful demonstration of his electric light at Menlo Park, New Jersey.

Much was made of this invention by the papers and magazines of the day, due to the adverse criticism which had previously been directed at Edison's efforts to produce illumination by electricity. Features described were the brilliancy of the "beautiful light" together with the elimination of disagreeable odors and the use of matches.

The success and immediate popularity of the electric light created a demand for copper insulated wire unheard of up to that time.

THE NEW ENGLAND BUTT COMPANY, always keeping abreast of the times, and always looking for new products to manufacture, immediately sensed that a new industry was being born.

"Butt" engineers have, through the years, developed a complete line of wire stranding, cabling and insulating machines, until today "Butt" machines are used in the manufacture of wire and cable for lighting systems throughout the world.

THE NEW ENGLAND BUTT COMPANY offers you now the same efficient service as it has consistently rendered in the past.

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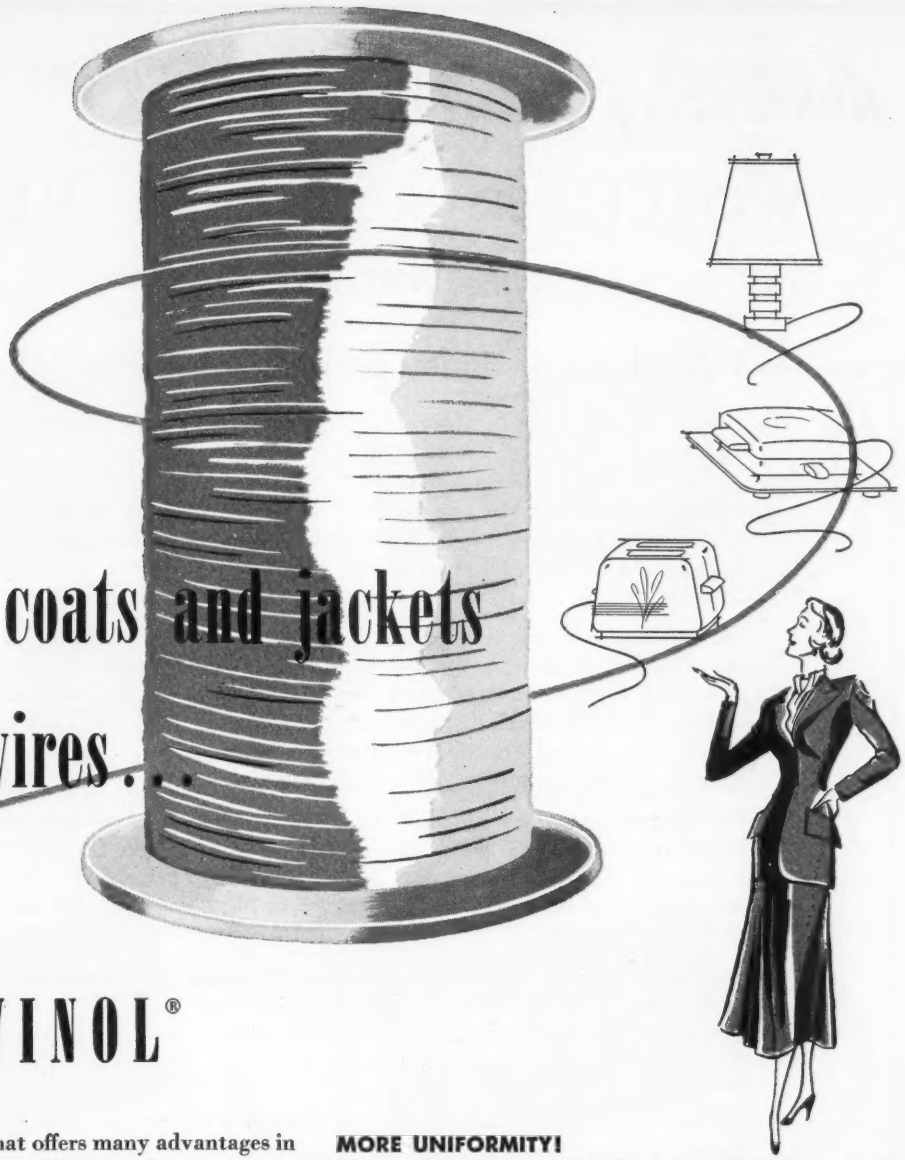

Better coats and jackets for live wires... with MARVINOL®

Here's a new vinyl resin that offers many advantages in coating or jackets for wiring. For example:

MORE STABILITY! Marvinol offers superior stability in processing and in end products. High molecular weight gives it extra toughness and "dryness" . . . yet it is easy to formulate by extruding, injection molding or other processes . . . is among the most versatile of vinyl resins. Wire covering made from Marvinol has greater resistance to heat and light, greater low temperature flexibility, may be brilliantly or delicately colored, has less heat deformation. Marvinol "coats and jackets" are also highly resistant to oils, acids, foods, aging, wear and other normally destructive factors.

MORE UNIFORMITY! Marvinol resins are a development of Martin research and Martin's quarter-century of plastics experience. They're being produced in the world's most modern chemical plant to assure unexcelled uniformity, and production quantities are now available to processors. The Glenn L. Martin Company, maker of Marvinol, does not compound or fabricate in the plastics field. If you make or coat wire, our sales engineers and customer service laboratory offer full technical cooperation. If you buy or use finished wire, ask your supplier about Marvinol. Chemicals Division, The Glenn L. Martin Company, Baltimore 3, Md.

Martin ® Marvinol

Resins, Plasticizers and Stabilizers Produced by the Chemicals Division of

THE GLENN L. MARTIN COMPANY—AN INTERNATIONAL INSTITUTION

"Better Products, Greater Progress, Are Made by Martin."

Announcing the Annual ...

WORCESTER REGIONAL MEETING

of the WIRE ASSOCIATION

To be Held on Friday Evening, April 30, 1948 at the Sheraton Hotel, Worcester, Massachusetts

Interesting and timely papers will be presented following the dinner, which is scheduled for 6 P. M., and a motion picture, "Watts in Glass", will be shown after the technical session through the courtesy of the Owens-Corning Fiberglas Corporation.

The meeting will be held under the chairmanship of Rodman R. Tatnall, Metallurgical Engineer, Wickwire Spencer Steel Division, Colorado Fuel and Iron Corporation, Morgan Works, Worcester. A brief address of welcome will be made by LeRoy D. Seymour of John A. Roebling's Sons Co., newly elected President of the Wire Association. Following this two papers will be presented, after each of which questions may be asked.

The first to be presented will be "The Treatment of Waste from Wire Manufacturing Plants, with Special Reference to Pickle Liquors", by Brun J. Queern, Chemical Engineer, Dorr Co., New York, N. Y. Mr. Queern has supervised several such installations in New England and has a practical knowledge of his timely subject.

Following this, A. DiGuilio, Consulting Engineer for the Upton Electric Furnace Co., Detroit, will give a talk on the new method of coating steel with aluminum. This process has stirred widespread interest and is sure to be worth coming to hear.

PLEASE MAIL YOUR RESERVATION CARDS PROMPTLY. MEMBERS MAY BRING GUESTS. PERSONS NOT MEMBERS, WHO ARE ACTIVELY IDENTIFIED WITH THE WIRE INDUSTRY, ARE ALSO CORDIALLY INVITED. WRITE, SAYING YOU WILL BE THERE, SO WE CAN PROVIDE DINNER ACCOMMODATIONS.

We shall hope to see you there!

Tickets, including registration, dinner and meeting: $5.00

THE WIRE ASSOCIATION

300 MAIN STREET STAMFORD, CONN.

Richard E. Brown, Executive Secretary

Note: If you plan to remain overnight, please make your own room reservations direct with the Sheraton Hotel.

Which of these Characteristics do you Require?

These are but a few of the many Wissco steel specialty wires produced by Wickwire Spencer, whose ability to meet exacting specifications has been a tradition for over 125 years.

We can meet your requirements for high or low carbon steel specialty wire; round or shaped; in a wide variety of sizes, tempers, grades and finishes. Send your order or inquiry to Wickwire Spencer.

IN THESE WISSCO WIRES *Strength and Flexibility* ARE ESSENTIAL

WISSCO HOSE REINFORCING WIRE, Wissco Shaft Wire and Wissco Crimped Brush Wire, while differing in chemical and physical composition, are all high in tensile strength and are manufactured for specific applications.

THESE WISSCO WIRES ARE DESIGNED FOR *Severe Forming Operations*

WISSCO BINDING WIRE and Wissco Preformed Staple Wire must be of close tolerance and uniformity as to tensile strength, hardness, size and finish.

HERE'S A WISSCO WIRE IN WHICH *Workability* IS AN IMPORTANT FACTOR

WISSCO SPHEROIDIZED WIRE is dead soft and easy on your wire working machines. After fabrication it is of a suitable type of material for hardening.

IN THESE WISSCO WIRES *Precision* IS OF VITAL IMPORTANCE

WISSCO DENT SPACER WIRE and Wissco Card Wire are held to tolerances as close as one ten-thousandth of an inch . . . must also be uniform in temper and finish and, in case of card wire, must be very straight and uniformly tempered.

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A PRODUCT OF WICKWIRE SPENCER STEEL DIVISION · THE COLORADO FUEL AND IRON CORPORATION

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PACIFIC COAST SUBSIDIARY—THE CALIFORNIA WIRE CLOTH CORP., OAKLAND 6, CAL.

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ACROPAK has no crevices, no weak points, gives more strength with less weight. ACROPAK can be reversed on spindle without re-setting the traverse. ACROPAK is adaptable to end take-off.

ACROPAK assures a minimum of wire breakage through uniform flow of wire on and off spool. Because ACROPAK cannot rust, it does not have to be reconditioned by cleaning and buffing after each use.

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Add another factor . . . visual sales appeal. ACROPAK's smooth, bright exterior lends a fine appearance to the finished wire package.

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Barrel Diam.	3½″	2½″
Traverse	3 to 3½″	3 to 3½″
Arbor Size	⅝ & 3″	⅝″

PROMPT DELIVERY

may be had on all standard spools. Telephone or wire for quotations and delivery commitments.

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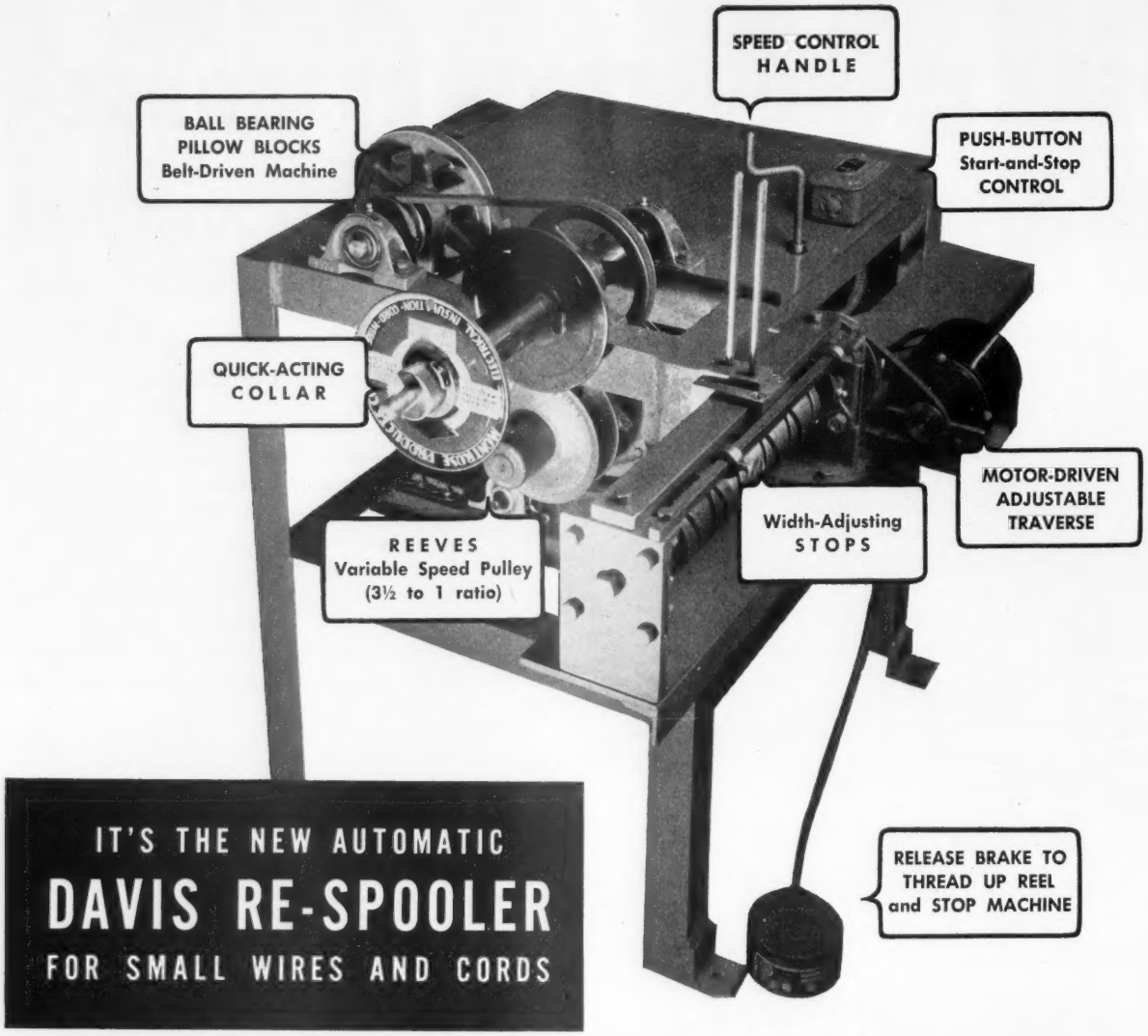
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BALL BEARING PILLOW BLOCKS Belt-Driven Machine
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Width-Adjusting STOPS
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RELEASE BRAKE TO THREAD UP REEL and STOP MACHINE

IT'S THE NEW AUTOMATIC DAVIS RE-SPOOLER FOR SMALL WIRES AND CORDS

- **Layer-winds parallel cord by adjusting spindle speed with the Reeves Drive and the Traverse running at constant speed!**
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THE R. L. DAVIS ELECTRIC CO., INC. • WALLINGFORD, CONN.

SPARK TESTERS • SPOOLERS • TAKE-UPS • CAPSTANS

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YOU as a leader in your community have a sacred obligation--to yourself, your family, your neighbor and your country, Use your experience and knowledge to the full extent of your ability to shape a public opinion which will help to establish right and justice for a lasting world peace, and preserve our country's cherished heritage of freedom for the individual.

Only through the intelligent, active work of community leaders can we keep America as the impregnable citadel of liberty and freedom.

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MANUFACTURERS OF CARBON ALLOY AND YOLOY STEELS
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Wire that speaks <u>after</u> it's spoken to!

Another unique use demonstrating the versatility of ARMCO Stainless Steels is wire for home recorders.

This bright, thin wire records your favorite radio programs . . . your own voice or the voices of your children and friends . . . then plays them back clear and faithfully.

Wire for home recording sets not only must be strong and rustless, but must have special magnetic properties for good reproduction. ARMCO Research men worked closely with manufacturers of recording wire in developing a stainless steel with the precise magnetic quality needed for brilliant, noise-free recording.

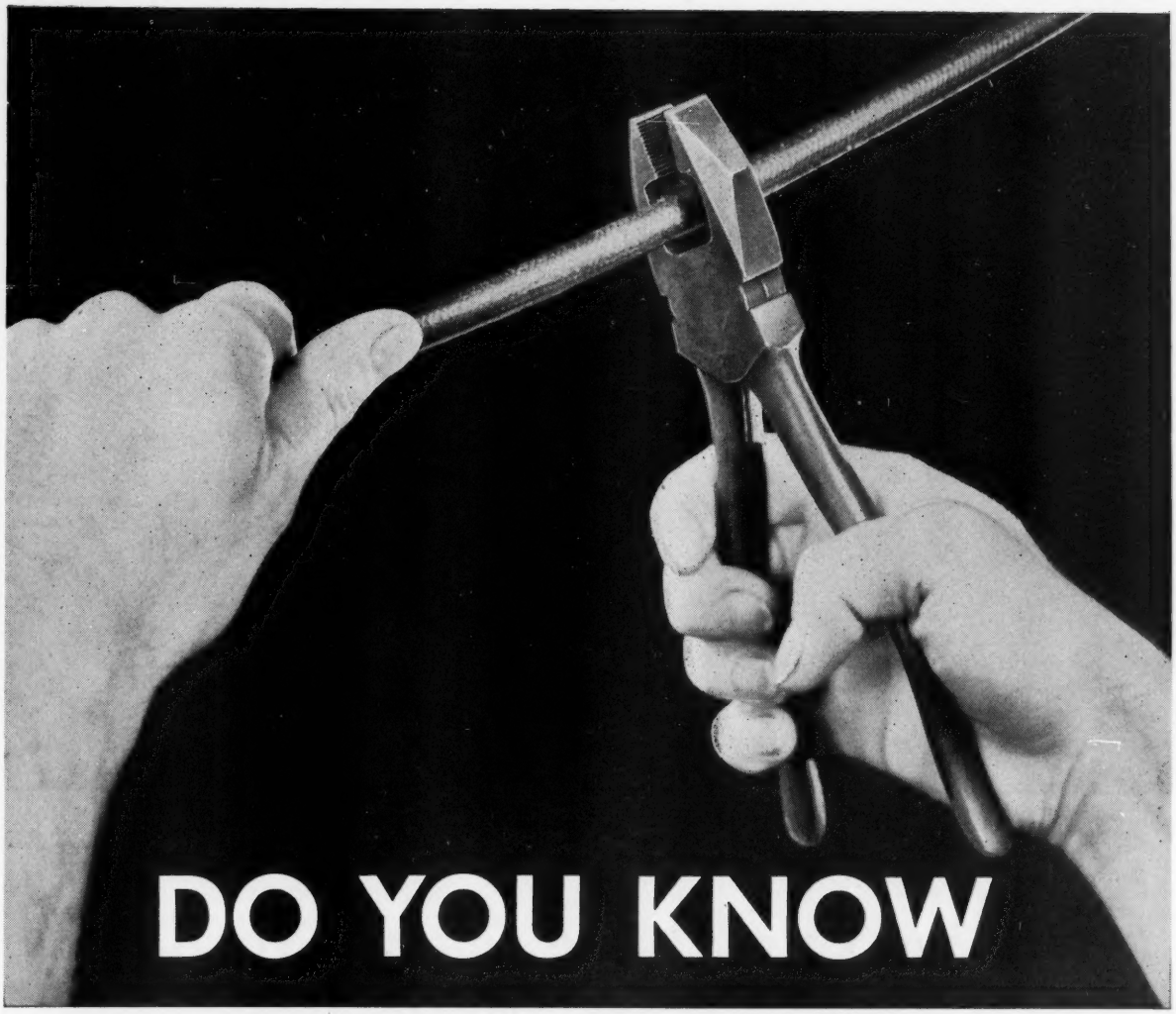
This is only one of the many special-purpose stainless steel wire grades produced by ARMCO. There are more than 60 standard and special grades, drawn in many shapes and sizes. You can specify ARMCO Stainless Steel Wire of various tempers, wire with exceptional resistance to heat and corrosion. With it all your products will have the proved extra sales advantages of Stainless Steel.

Low-Cost Polishing. The new ARMCO Electropolishing process is ideal for many small products made of stainless steel wire. It is simple and inexpensive. An electrically-charged chemical bath gives a lasting lustre to the entire surface—reaching even the deepest recesses.

Perhaps ARMCO Engineers can help you solve your wire problems. Write us for data pertaining to your products. Just address The American Rolling Mill Company, 257 Curtis Street, Middletown, Ohio.

Rustless DIVISION OF ARMCO

ARMCO STAINLESS STEEL WIRE



. . . THAT FIBERGLAS* 150's YARNS USED FOR OUTER BRAIDS OF NONMETALLIC-SHEATHED BUILDING CABLES OFFER:

Low Material Cost of Braid

Fewer Yarn Package Changes . . . *Less Braider Down Time*

Fewer Yarn Breaks . . . *Improved Braiding Efficiency*

Lower Cable Shipping Costs . . . *Lighter Weight*

For complete information about Fiberglas Yarns for this and other electrical uses, write Owens-Corning Fiberglas Corporation, Dept. 875, Toledo 1, Ohio. Branches in principal cities.

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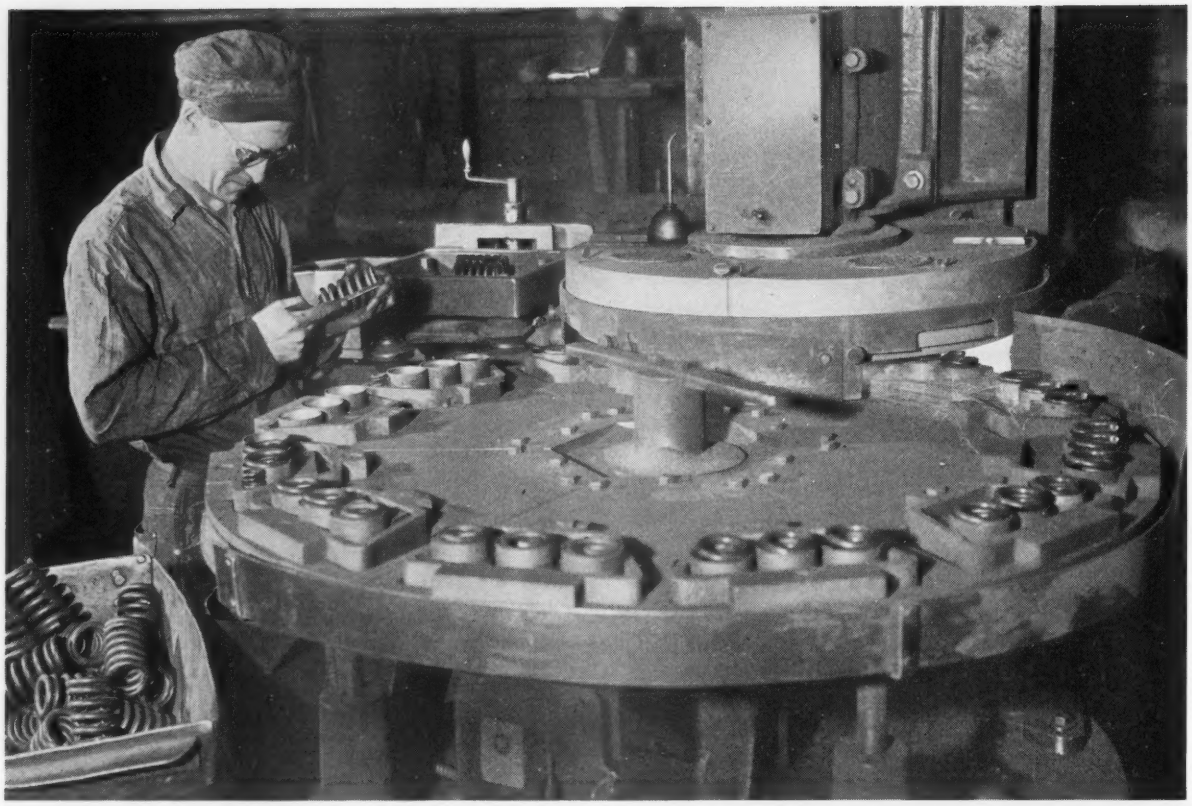
OWENS-CORNING FIBERGLAS Yarns

T.M. REG. U.S. PAT. OFF.

*FIBERGLAS is the trade-mark (Reg. U. S. Pat. Off.) for a variety of products made of or with glass fibers by Owens-Corning Fiberglas Corporation.



Here's Why!

You Can **Grind More Springs For Less** with NORTON Vitrified Discs!

- They cut hardened steel fast and cool
- They minimize the danger of burrs, burning or distortion
- They remain flat and sharp
- They resist grooving
- They require a minimum of dressing

Especially popular for grinding springs are Norton vitrified discs of tough 57 ALUNDUM abrasive — regular or OPEN STRUCTURE — and discs of the sensational, new 32 ALUNDUM abrasive.

These discs are available in all standard sizes (15" to 72" in diameter), and with all types of mountings (including inserted nut and plate mounted).

Contact your Norton abrasive engineer or distributor for exact disc specifications to meet each of your spring grinding problems.

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NORTON ABRASIVES

SHEET · BAR · ROD · FLAT · ANGLE · HALF-ROUND · HEX

WIRE · ROUND · SHEET

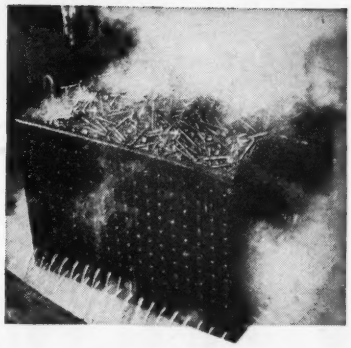
How shall I Use Monel To Make the Best Pickling Basket?

There are as many answers as there are standard mill forms of Monel*

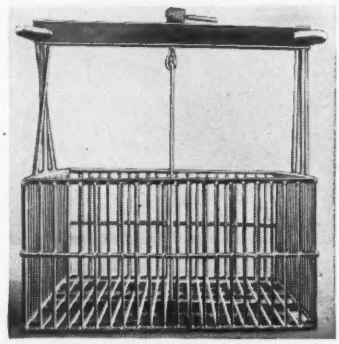
COME ALONG AND SEE WHY . . . .

WIRE · ROUND · SHEET

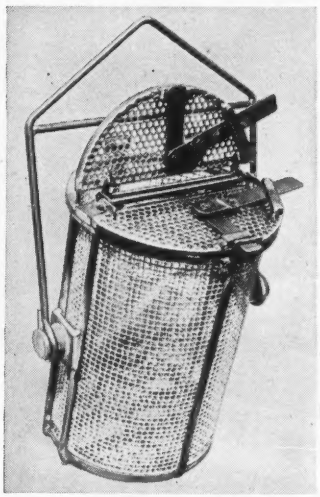
SHEET · BAR · ROD · FLAT · ANGLE · HALF-ROUND · HEX



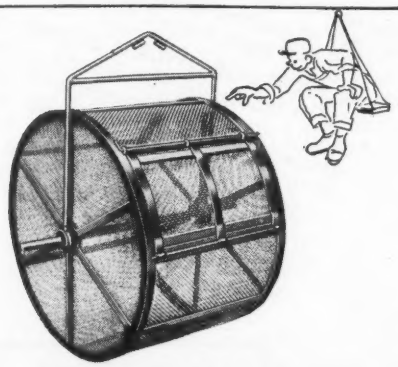
1. HERE'S A 307-POUND WELDED BASKET of perforated Monel* sheet. Capacity 2,500 pounds of bolts —10% more than the same size wood basket it replaced. Sharp edges can't chew into Monel. Metal construction gives easy acid flow and prevents uneven pickling.



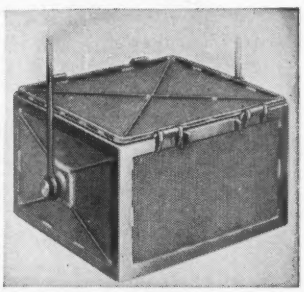
2. NEXT, A SIMPLE AND STURDY BASKET. Made entirely of corrosion-resistant Monel bar, it was welded by ordinary shop methods. The pin at top center is for hooking onto an overhead conveyor. Side index plates lock into the conveyor when the basket is carried. With a tensile strength of 80-95,000 psi, hot rolled Monel bar is a wise—and safe—choice for a job like this.



3. A COMBINATION OF THREE FORMS of Monel — screen, sheet and bar. This revolving basket weighs 220 pounds, and has a capacity of more than 500. The unique top fastening permits fast and *complete* dumping. Because of Monel's toughness and ductility, a basket like this stays in service long after others have hit the scrap heap.



4. STILL ANOTHER combination, this time of Monel angles and flats, welded together and covered with Monel wire cloth. Hanger and shaft are Monel rod. In all forms, Monel provides high resistance to pickling solutions commonly used by steel mills.



5. SMALL PARTS won't hop out of this all-Monel basket. *They're locked in.* The basket lid is easily removed for loading and unloading.

*Reg. U. S. Pat. Off.

Whether you pickle bulky hollow ware, heavy forgings or small stampings, it's easy to build strong, long-lasting baskets that exactly meet your needs.

Use standard mill forms of

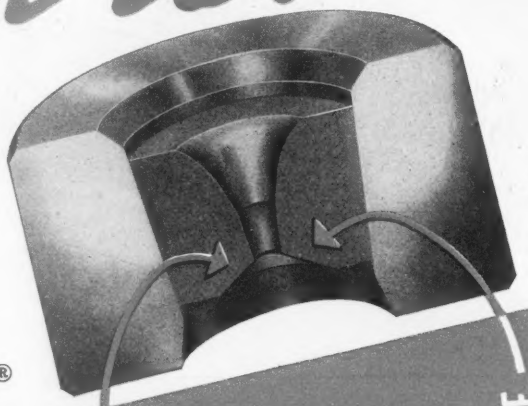
Monel* INCO TRADE MARK

THE INTERNATIONAL NICKEL COMPANY, INC.

67 Wall Street, New York 5, N. Y.

Here it is!

THE NEW V-R®



CARBIDE DIE *with the new* ROUGH CORED BACK RELIEF

HERE'S YOUR ANSWER

To increased die room costs. V-R's new die design successfully eliminates a definite cause of die breakage and die nib chipping. Developed specifically to reduce re-cutting costs, the new V-R rough cored back relief feature abolishes a costly re-sizing operation. Remember...the wise die room foreman chooses V-R carbide dies because ONLY V-R gives him the four most outstanding and practical features ever incorporated in a single die!

1. TAPERED NIB: Greater sidewall strength and improved distribution of drawing stresses.
2. TAPER-GRIP CASING: Extra wide tapered front and back openings mean easy inspection, simple maintenance, better lubrication and NO STEEL CASING TO CUT FOR RE-SIZING.
3. PERFECT CONCENTRICITY: The exclusive Vascoloy-Ramet method by which die nibs are pressed and finish ground assures you of perfect concentricity between die nib and casing.
4. ROUGH CORED BACK RELIEF: The new V-R carbide die nib feature eliminates a costly die room operation over the entire range of hole sizes for the life of the die. With the proper back relief angle built right into the die nib, breaking and chipping due to oversight or neglect is a thing of the past.

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NORTH CHICAGO
ILLINOIS, U. S. A.

DISTRICT SALES AND SERVICE IN PRINCIPAL CITIES

AN AFFILIATE OF THE FANSTEEL METALLURGICAL CORPORATION AND THE VANADIUM ALLOYS STEEL COMPANY

The Wire Outlook

Business activity is reported to have become stronger following the drop in commodity prices earlier in the year, the reason being that more consumer dollars were freed for the purchase of factory products.

While indices show a high level of activity on all sides, surveys point to a preponderant belief — or fear — that there may be a slowing down in the second half of the year, probably in the third quarter. There are no statistics to support such a probability, but rather a feeling of uneasiness that it may occur. However, a depression is not expected, more an easing-off tendency. Buying is close and inventories are low.

Steel production estimates for 1947 were placed at 84,787,500 tons, the highest in any peace-time year and 18,000,000 tons over 1946. In this, the wire industry found no comfort, for approximately 2,000,000 tons less than in 1946 was converted into rods. If the Marshall Plan is put into operation, the shortage may be extended for at least two years more.

Nevertheless, 1948 promises some improvement due to new steel production facilities coming into operation and a larger percentage than heretofore earmarked for wire channels. One factor contributing to this will be the higher prices for nails and fencing, items that are badly needed, but that have represented little or no profit to the mills. Another is government pressure to direct more wire to the nail rooms or plants.

Scrap prices have tended to soften owing to the reluctance of steel concerns to place orders at current quotations, in spite of the continuing need for greater quantities of scrap for the larger production schedules. While scrap is tight, there is a general expectation of lower prices in the Spring. Those fabricators who are producing scrap can expedite the trend by keeping their scrap moving back to the mills promptly and regularly.

Nails still appear to be heading the list of tight merchant items. Orders for barbed wire and other types of fencing have been steadily accelerating with the approach of Spring and there is no visible abatement in the demand for manufacturers wire. Rod requirements especially for cold heading and low carbon stock, run high, with the former almost at a critical stage.

Aluminum, which was fairly plentiful last year, has also become more difficult to procure, due to the many new uses to which this light, but strong metal is being put. Production schedules on rod, wire and bar have suffered in the scramble for other forms of metal.

While the copper supply is generally inadequate, brass and wire mills are reported to be getting a fairly good supply. Domestic refinery production has been somewhat lower and Chilean producers are shipping to this country as much copper as they are able to. Producers are alloting tonnages to their customers.

Pressure on lead producers has eased slightly with consumers studying inventory positions in anticipation of the possibility that prices may have reached their peak.

Demand for zinc of all grades continues steady, although a small decline in orders has been noted by producers. World stocks of tin this year will be short about 13% of estimated needs, so that an early betterment in supply is not in prospect.

While most people expect that the Marshall Plan will be put into operation in the Summer, it will not cost the mere five billion dollars a year that is so much publicized, but more nearly $20,000,000,000 a year for foreign aid, if all of the indirect and incidental expenditures are taken into consideration, according to one prominent commentator on economic affairs.

It would therefore seem high time that the Congress and our citizens were apprised of the facts regarding the Administrations' global foreign policies. It becomes of paramount importance that drastic economies at home should preceed any embarkation in so vast an undertaking.

There are several musts. We MUST cut Federal expenses — notably bureaucratic operations. We MUST cut taxes. We MUST be strong. We MUST be firm in our foreign relations. We MUST root out and eliminate subversive activities.

If some of these appear to be contradictory, let us not overlook the fact, that the basis for the successful achievement of these ends is the drastic curtailment of unneeded government extravagances.

—from the Editor's Desk

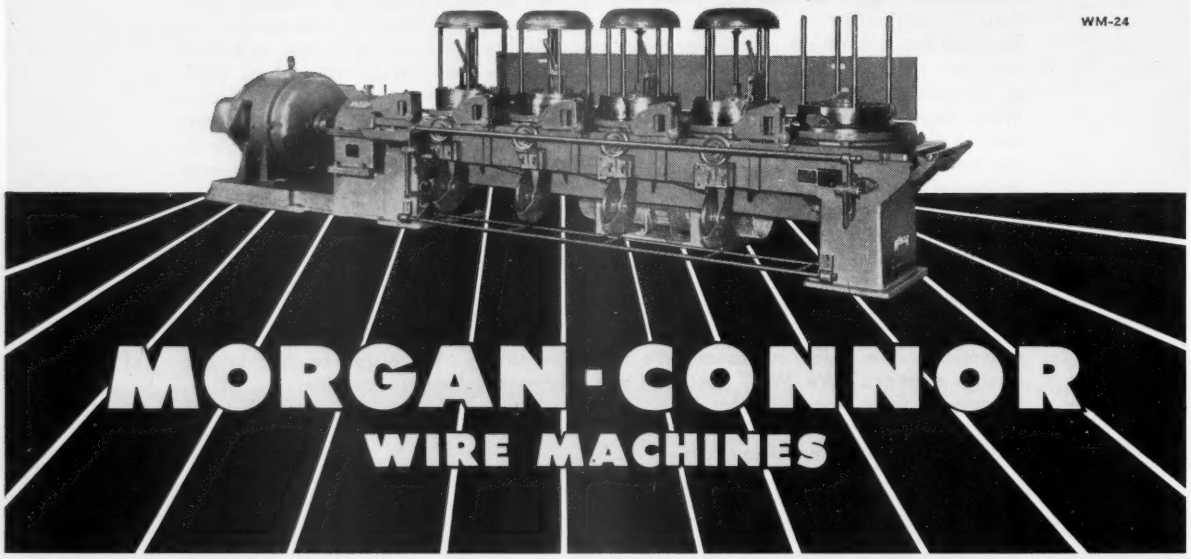
On which of your wire machines are operating costs excessive?

Are these costs high due to low speed? . . . low efficiency? . . . operating too few per man? . . . high repair and maintenance expense? Whatever the cause these machines should be tagged for replacement at the first opportunity.

Why not let a Morgan engineer explain the extra benefits of replacing with Morgan-Connors? Let him help you work out a replacement program in keeping with your budget and production schedule.

MORGAN CONSTRUCTION CO.
WORCESTER, MASSACHUSETTS

WM-24



MORGAN-CONNOR
WIRE MACHINES

WIRE AND WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip, Wire and Rod Products and Insulated Wire and Cable.
DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 23 APRIL, 1948 No. 4

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Stevens Flanged Steel Traverses are manufactured in a wide range of sizes up to 56" diameter and 48" traverse...in plain, painted and hot dip galvanized finishes. The special "Reinforced Type" has *extra strength* where it is needed most—at bolt holes and base of the flange—yet saves weight through use of lighter gauge steel. Width of flange and number of bolt and drain holes are furnished to your specifications. Write for prices.

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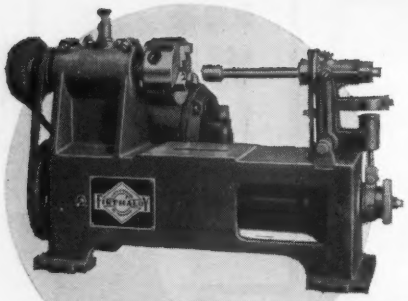
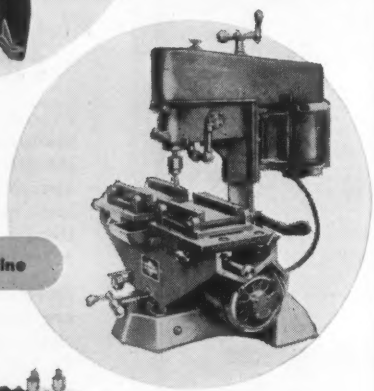
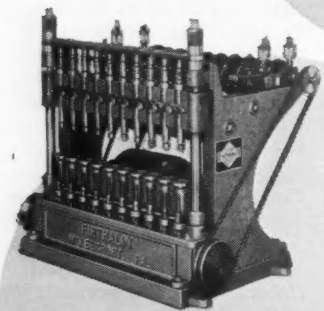


Polishing and Hand Finishing Machine

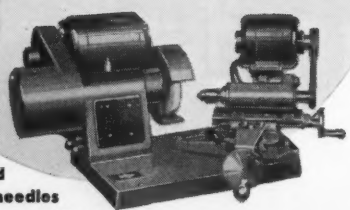
Drilling and Ripping Machine



Nail Die Barbing Machine



Ten Spindle Drilling Machine and its accessory Needle Grinding Machine



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WIRE
AND WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip.
DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 23 April, 1948 No. 4

WIRE FORMS

By Herbert Chase, M. E.

Forrest Hills, N. Y.

Published in Two Parts
Part I

Wire Forms have exceptional and diversified utility and are available in a wide range of sizes, shapes, materials, and types of finish. High rate of production in automatic machines makes for low piece cost.

FEW products have so wide and general applications as those known as **"wire forms"** and yet have so commonly escaped the detail attention of so large a proportion of designers and other engineers and production men. Not a few of these individuals are unfamiliar with the term and with the methods by which wire forms are made, even though this type of product is constantly before them and frequently enters as a component of other products designed and manufactured under their supervision.

* * *

Definition

WIRE form is the name applied to products shaped from wire or metal ribbon, usually in what is called a wire forming machine. A fairly representative group of wire forms is shown in Fig. 1 and a larger group of products produced from metal ribbon on the same type of machine is shown in Fig. 2.

* * *

ALTHOUGH such machines are in extensive use, they are not commonly found in general metal working shops. These machines are operated, as rule, either by companies that specialize in making wire forms or by those making a particular product that is largely or wholly dependent upon the forming of wire or metal ribbon. In consequence, most product designers depend upon commercial suppliers for wire forms and give little or no consideration to their design beyond that the wire form performs its function adequately.

* * *

Importance and Application

THE importance of wire forms is a result of their unique and diversified utility and of their low cost per piece. Low cost is attained because production is generally quite rapid and often completely automatic and because, in the average case, the material used is low to moderate in price. In general, dies are not very expensive and forming machines do not require a large investment as compared with many other high production machines. There are also available thousands of stock dies for making parts in extensive use, hence many of the commoner wire forms can be had without investing in special dies.

* * *

APPLICATIONS, though most extensive in metal products, include thousands of uses in such items as wearing apparel, many kinds of textile and leather products and those made from wood, paper, plastics, glass, ceramics and other materials. There is also a varied and exceedingly large use in such finished articles as clips, pins, tacks, rings, hooks, eye-stems, keys, loops, handles, staples, buckles, chain, fastenings of uncounted kinds and a great variety of other parts. The annual production of a large proportion of such items runs into many millions.

* * *

SPRINGS of various shapes constitute an exceedingly important group of wire forms but, as coil springs and certain other conventional shapes of springs ordinarily are made in somewhat specialized wire form machines, consideration of these types is not included in this article. Items here considered, though including many "special" springs, are those produced in general purpose wire forming machines

not designed exclusively for spring manufacture.

* * *

MANY of the parts produced on wire forming machines, including several shown in Fig. 2, could be classed as stampings, since an endless variety of stampings is made from ribbon or strip stock that also can be handled in wire forming machines. In fact, a considerable proportion of wire forming machines, among them that shown in Fig. 3, include within their frame a light stamping press that is often used not only on ribbon stock but also on wire of circular and other sections. There is thus no sharp distinction between some wire forms and certain parts that may be called stampings. Those here considered, however, are of the type ordinarily produced in wire forming machines.

Advantages

AMONG the many advantages of wire forms are:

1—Rapidity of production in quantities (often exceedingly large) on a repetitive basis such that each piece is a substantial duplicate of each other from the same dies.

2—Availability in an endless variety of shapes and sizes ranging from simplest to quite complex.

3—Producibility from stock that is often quite low in cost and is available in a wide range of analyses and often in a variety of finishes.

4—Highly efficient utilization of material, often with only trifling waste.

5—Low over-all cost resulting from the use of fast and often automatic machines and from efficient application of material itself commonly low in cost.

6—Ability to maintain size within reasonably close limits when this is essential.

7—Adaptability to wire of any available sectional shape and to metal ribbon of almost any commercial width and thickness up to 2 in. or wider.

8—Producibility from stock that is remarkably smooth, in shapes that are commonly free of burrs and well adapted to handling.

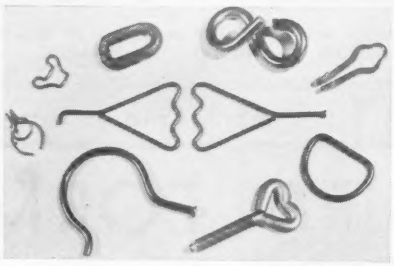

Fig. 1 — Typical wire forms most of which are relatively simple parts having bends in only one plane. Two of the parts have upset ends, one has two large flats and one has a thread chased in a supplementary operation.

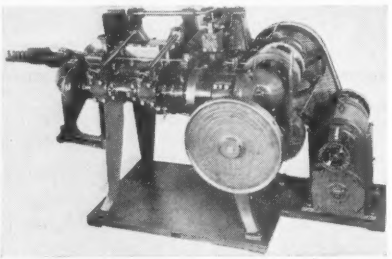

Fig. 3 — Wire forming machine that includes, near left end, a press that can form flats or notches, pierce holes or slots and do certain other operations before the stock enters the forming station where there are four horizontal slides to which parts of the forming dies are attached. At extreme left are small straightening rolls. * * * * * *

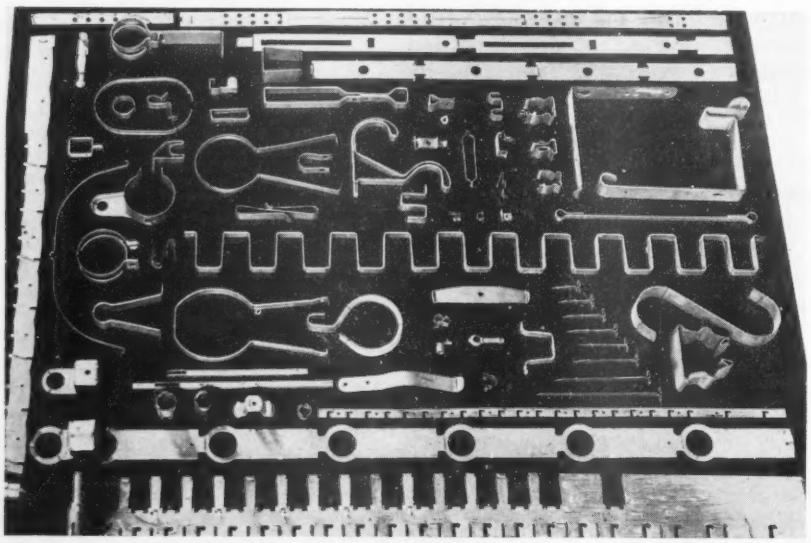

Fig. 2 — Typical wire forms produced from ribbon stock. Several have pierced holes or slots and some, produced in progressive operations, are not completely formed. In most cases, the form falls from the machine ready for use. * * * * * *

9—Producibility, in many cases, completely in a single fast machine and often in a pre-finished stock or one that requires no applied finish.

10—Adaptability to an endless variety of uses including those in which almost any property available in wrought metal is attainable.

* * *

REASONS for use include those in which any one or more of the foregoing advantages are attainable. Utility is often dependent not only upon availability at low cost but upon ready adaptability to the job and to ability to accomplish a given purpose better than it can be accomplished by other means.

* * *

Production Methods and Equipment

WIRE forms are made on a machine in which the form itself usually occupies a central, vertical, fixed position. The form is that portion of a steel die around which the wire or ribbon is shaped, (F, in Fig. 4) hence the sectional shape of the form approximates the shape of the part or that portion of it which it shapes.

* * *

IN the ordinary machine, there are four slides, (three of which are shown at A,B and C, Fig. 4) each arranged to move horizontally toward (and subsequently away from) the central form in correct and precisely timed sequence. Actuation of the sides is accomplished by cams which are on shafts usually driven by gearing from a single motor, as in Fig. 3. Each slide (if all are used) carries a portion of the die and, as the slides are advanced, the wire or ribbon is bent around the form and finally is stripped from the form.

* * *

DURING an average cycle, the machine operates as follows: (extreme left in Fig. 3) and is fed to a stop. As the wire comes to rest, it is held against the form and cut to length by a shearing device. As this takes place, the front die slide (D, in Fig. 4) on this slide (A) starts to bend the piece around the form. This motion not only gives the wire the shape of the front of the form but bends the remainder of the length so that the ends lie, usually, against the sides of the form.

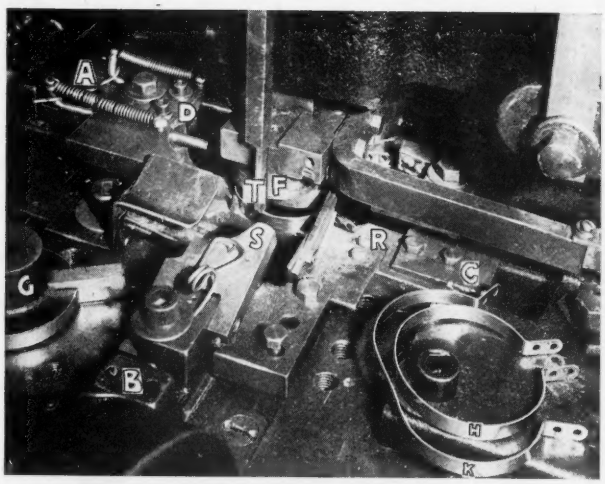

Fig. 4 — Close up of a portion of a four-slide machine equipped with dies for making the stainless steel wire form shown completely shaped at H. A, B and C are slides that carry and operate, respectively, die parts D, S and R, which, together with another die part on a slide on the far side and hidden in this view, shape the ribbon around the form F. In the first forming operation, the piece is given the shape shown at K and then this piece is dropped to a lower level where it is given its final form H by supplementary die elements in the next cycle. T is a stripper. At G is a gage which the finished piece must fit. * *

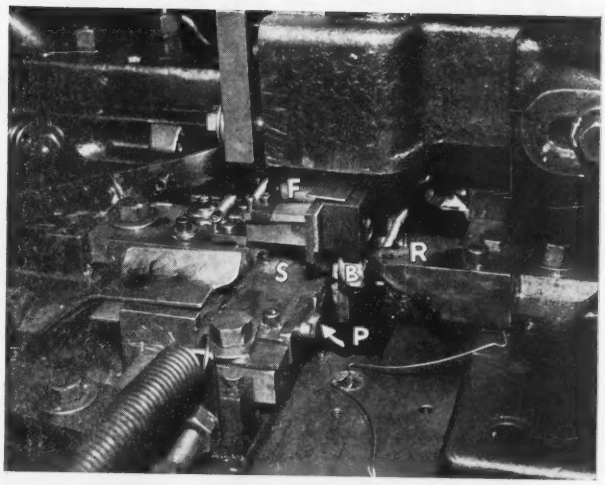

Fig. 4A — Setup in a wire forming machine for producing the stainless steel spring in the foreground. F is the form itself and S is one of the side dies. Rear die R carries pivoted blocks B that are rocked upward to clamp the wire ends of the wire and form it in cooperation with projection P. * * * * *

NEXT, one or both side slides (one shown at B, Fig. 4) are advanced, each with its portion of the die and these portions bend the ends of the wire against the sides of the form and usually around the back. Then the back slide is advanced and shapes the wire against the rear face of the form, generally completing the forming operations. Finally, after all slides are withdrawn, a stripper (T, in Fig. 4) moving downwards, pushes the part off the form and it drops into a chute.

* * *

THIS cycle, though typical, is capable of many variations and, if the machine includes a stamping press (as many machines, including that in Fig. 3, do), it can be closed in timed relation to perform one or more additional operations, usually on the wire before it is advanced into forming position. Thus, the press may produce flats, pierce holes, cut or form notches, necks or slots, point an end or produce an upset. Some machines have presses arranged to perform some operations after forming, such as assembling a mating part which may be formed itself in so doing.

* * *

IT is not always possible to complete forming in a single position. In that event, instead of being ejected, the partly formed piece is shifted to a lower level where the form has a different shape. This is done in the setup, Fig. 4. At the upper level, the piece is given the more open shape shown at the right (K) and, after being dropped to a lower level, is given the more nearly circular shape, also shown at right (H) of Fig. 4. At the lower level portions of the dies on the same slides perform the additional forming operations.

* * *

THERE are cases in which it is necessary to do forming even at a third level before the piece is finally ejected. As a rule, however, the setup is such that a completely formed piece drops from the machine at the end of each cycle. It is not necessary, as a rule, to have separate slides or dies for the second or third level, as the dies can be extended so as to reform, at a lower level, the same piece formed at the prior stroke on the higher level. Thus, there is simultaneous forming on more than one level by successive parts of the same die in somewhat the same way that progressive stamping dies work.

* * *

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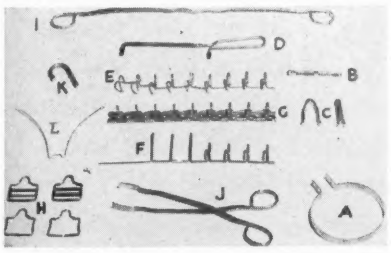


Fig. 5. — A group of wire forms produced by Eastern Tool & Mfg. Co. from several types of stock. A is a stainless steel ring produced in the setup shown in Fig. 4. B is a filing folder clip actually made and assembled from ribbon stock in a stamping press, although its elements could be shaped in wire forming machines. C is a copper part made from ⅛ x ¼ in. flat stock in the inverted V-shape form with ends slotted in the forming machine. Later, the part is closed to hairpin shape in a stamping press. F is partly formed wire made in a progressive operation. E is the finish-formed part from the same setup and is shown assembled to formed and pierced ribbon stock at G. At H are overall slides formed as at lower right, with ends welded, as the lower left, and as assembled to a formed stamping above. I is a wire form the flats on which are produced in the coining die, Fig. 6, after which the piece is cut in two and assembled to produce tongs J. At K is a padlock loop on which a collar is produced by an upsetting die on one slide of a forming machine before the U-shape portion is bent. L is a stainless steel spring that requires forming in three planes.

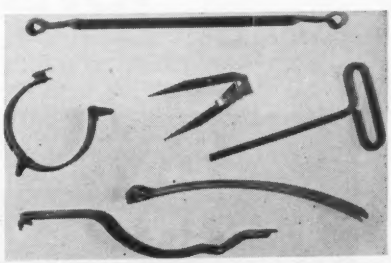


Fig. 5-A — Typical wire forms made from Ribbon or Square Wire. * * * * *

UPRIGHT ★ ★ ★

★ ★ ★ CONE

Wire Drawing Machines

FOUNDED WATERBURY FARREL 1851

THESE high speed machines are available in several sizes and can be had with either a coiling block or spooler. The spooler may be an attachment or a separate floor-type device, such as shown. This is the No. 4 machine with belt-type cradle spooler. It is driven by a direct-coupled motor (not shown), has 13 dies and capacity for drawing copper from ¼" maximum starting size down to a finishing size of from No. 10 to No. 18 B. & S. gage. The dies and the hardened steel drawing rolls are enclosed by a rolling steel curtain to confine the splash of the drawing lubricant.

WATERBURY-FARREL
FOUNDRY & MACHINE COMPANY
Waterbury, Connecticut, U. S. A.
SALES OFFICES CHICAGO CLEVELAND NEWARK, N. J.

The Administration of Inspection and Despatch in a Steel Wire Mill

By C. Coates, Esq.
Chief Inspector,
Frederick Smith & Co. Wire Manufacturers Ltd.,
Caledonia Works, Halifax.

A lecture presented in the Staff School, Caledonia Works, Halifax, England.

WHEN a consignment of wire is received by a customer it will be one or more of the hundreds of different qualities which are manufactured in a steel wire mill. It may be a few pounds of Electric lamp filament mandrel wire on reels, or coils of hardened and tempered steel wire for Card Clothing or Healds for the textile industry. It may consist of several tons of heavy gauge galvanized wire intended for the manufacture of ships' hawsers or it may be that it be bright high tensile steel wire for the production of one of the many types of spring used in Industry today. Again it may be galvanized wire for making corset steels, tinned wire for the armature binding of Electric motors, in fact anything from wire for Colliery winding ropes to the strings of pianos.

* * *

NOW, all this wire must be packed and protected from damage during transit. This may be the potential damage of rough handling, or of moisture causing rust or other surface injury to the wire.

* * *

THE wire must be readily identifiable by the customer and, therefore, will bear labels giving all the necessary details of quality. The customer must be advised against which of his orders the material is being supplied, together with full details of the number of coils and the weights involved. Each consignment must comply fully with the requirements of the specification against which it has been supplied. These, then, are some of the responsibilities of the Inspection and Despatch Departments which briefly can be summarized as follows:

The Inspection and Despatch Departments ensure that the wire against an order complies with the specification in all respects, that it is readily identifiable by the customer and is received by him in satisfactory condition on or before the date promised by the Company.

* * *

Inspection Department

An Organization which ensures that all material despatched conforms to the customers' requirements.

IN the manufacture of steel wire the production of the factory falls into 4 groups:

(1) 22″ and 26″ diameter coils of very heavy gauge wires.
(2) 18″ diameter coils of heavy intermediate to intermediate gauge wires.
(3) 12″ diameter coils for intermediate to fine gauge wires.
(4) 8″ diameter coils for fine gauge wires.

* * *

THESE classifications form an excellent basis for the sub-division of work in the Inspection department, as it is possible to have four separate sections, each dealing with one of the above classifications.

* * *

AN advantage of these classifications is that by splitting into sections it leads to smaller groups of workers and in each group or team each man can be allocated a specific task, which is much more preferable than having an unwieldy number of men all working together, with no particular job or responsibility being attached to any one man. The separating of the work into these 4 sections is made easier by allocating a distinct area of floor space to each section, and fixing the area by the use of dwarf walls.

* * *

THUS we have 4 areas or Inspecting Bays.

No. 1 bay for the inspecting of heavy gauge wires.
No. 2 bay for the inspecting of heavy to intermediate gauge wires.
No. 3 bay for the inspecting of intermediate to fine gauge wires.
No. 4 bay for the inspecting of fine gauge wires.

Customers' Requirements

AS we are dealing with a steel wire mill it follows that the standard methods for the testing of steel wire are used in determining whether the material is satisfactory.

* * *

EACH Inspection Bay, therefore, has suitable testing equipment for dealing with some or all of the following tests:

Size; Tensile; Torsion; Elongation; Flexion; Surface Condition.

* * *

THUS No. 1 Bay has:

1 Spring former
1 -12,500 lbs. capacity tensile machine.
1 Torsion machine.

No. 2 Bay has:—
1 Elongation machine
1 -2,500 lbs. capacity tensile machine
1 Torsion machine.

No. 3 Bay has:—
1 Flexion machine
1 -500 lbs. capacity tensile machine
1 -150 lbs, capacity tensile machine
1 Torsion machine.

No. 4 Bay has:—
1 -100 lbs. capacity tensile machine
1 -50 lbs. capacity tensile machine
1 Elongation machine.

* * *

THE Inspection department is in the charge of the Inspection Superintendent.

* * *

ALL the wire is passed through the Inspection department to ascertain whether or not it is suitable for the particular order to which it has been produced, and every coil is subjected to either physical, chemical or visual checks, or a combination of these three.

* * *

SAMPLES are taken from each end of every coil of sufficient length to check that the material meets the requirements of the customers specification.

THE organization of each bay is centered round the tensile test as this is the mechanical test which is required most; for instance, one order may require tensile and torsion tests — another tensile and elongation tests or tensile and spring forming tests.

* * *

EACH bay is manned by an Inspection team, all coming under the supervision of the Inspection Superintendent.

* * *

THESE teams consist of:
(1) A Leading Tester who operates the tensile machine, makes sizing tests and coordinates the work of the remainder of the team.

(2) One tester who operates the torsion and/or flexion equipment.

(3) One or more testers who prepare the material for inspection, by cutting from each coil the requisite number of test lengths, and help in the making of other tests.

* * *

THE leading tester is responsible to the Superintendent for the accuracy of all the tests made by himself, and the members of his team who make tests under his direction, he also exercises supervision over the team during the making of tests.

THUS we have a department which has equipment for making tests on wire, and has a staff capable of making the tests, providing they are in possession of the following information:—

1. **What** tests are required.
2. If tensile tests — what are the minimum and maximum strains allowed for the material.
3. If torsion tests — what minimum number of twists and in what length.
4. If flexion tests — what minimum number of bends and over what radius.
5. Any other tests which may be peculiar to the individual order.

* * *

THIS information is provided in the following manner. Each and every order received from the Sales department is split up into individual sizes and a master test sheet is issued for each size on every order number. It will be appreciated that to a certain extent at least, the work of the four Inspection Bays must overlap. (i. e. certain classes of material could be tested on either No. 1 or No. 2 bay whilst other classes of material could be tested on either No. 2 or No. 3 bay etc.) The master test sheets are therefore, issued as follows:—
First copy to Inspection Superintendent.
Second copy to the appropriate bay, but if, as has already been

Fig. 1 — Inspection Bay. * * * * * *

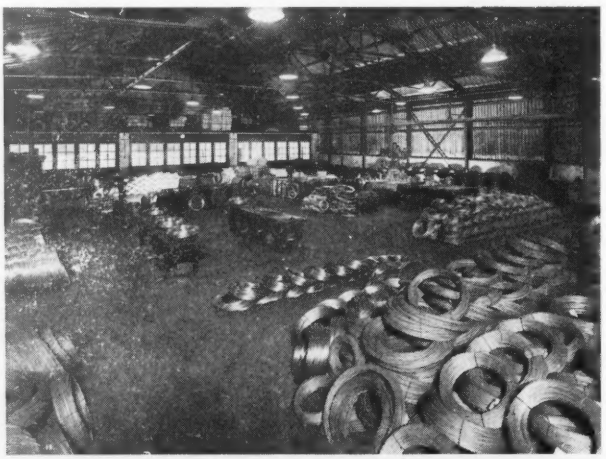


Fig. 2 — Warehouse. * * * * * *

explained, the material is capable of being tested on more than one bay, copies are issued to each bay on which the wire might be tested.

* * *

THE following information is contained on each master sheet:

(1) Order number.
(2) Weight required.
(3) General description of material.
(4) The minimum and maximum figures of all the tests to which the material has to be subjected.
(5) Details of any special characteristics which have to be observed during the inspection of the material.

* * *

EXAMPLE of master test sheet.

(1) 1234 ABC
(2) 5 tons.
(3) Bright Drawn Steel Spring Wire .064" 90/100 T.P.S.I.
(4) .0635/.0645"
648 lbs. min. /721 lbs. max.
(5) In approx. 1½ cwt. coils.
Diameter of coils to be 18"
Clean, bright and free from defects.

* * *

THE Superintendent, therefore, has a complete set of master test sheets covering each item on every order. Each Inspection Bay also has a master test sheet for every size on order which might be tested on that particular bay. All the master test sheets bear full instructions as to the tests and conditions which have to be applied to that particular size. On receipt of a batch of material into the Inspection Department the Superintendent indicates to the Production Transport to which Bay the material has to be delivered. The wire is then identified by the accompanying ticket which bears the relevant details.

* * *

ON receipt of the material into his bay, the leading tester refers to the appropriate copy in his master test sheet file and, after noting what tests etc. are required, instructs his assistants on the preparation of the material for inspection. In each case the leading tester indicates to his team what type and number of test lengths to remove from the coils.

* * *

INSPECTION then proceeds as follows:—

The leading tester checks the material for size, that is, whether it is within the size tolerance detailed on the master test sheet, and makes the tensile strain tests, whilst one or more of his assistants carry out any other tests required under his direction.

* * *

AFTER the mechanical tests have been proved the leading tester then checks the material for type of surface finish or weight of coils or diameter of coil; if all these are found satisfactory the material is then ready to be sent to the Warehouse for packing and despatch.

* * *

A clearing service for approved material is constantly maintained by the internal transport truck, between the Inspection Department and the Warehouse.

* * *

THE work of the Inspection Department can be summarized as follows:

(a) Checking, that the material is satisfactory and conforms to the specified requirements and, therefore, can be despatched to the order.

or (b) A search for material which is not satisfactory for the particular order in hand and the 'weeding out' of any such material from the batch.

* * *

BY approach (a) the work becomes a routine checking that a coil is satisfactory.

* * *

BY approach (b) the work never becomes routine — it is a constant search for UNSATISFACTORY MATERIAL, which has as its aim the removal of such material from the batch thus preventing it from being despatched to the customer and becoming a source of complaint. Although the results are, in the end the same, I believe that the efficiency of the Inspection Department is higher by using the latter approach.

* * *

Material which Does Not Meet the Requirements of the Test Sheet

DETAILS are only recorded of coils which fail to meet the requirements of an order.

* * *

DURING the course of the inspection of a batch of material it may be found that part, or all of the batch does not meet certain of the requirements detailed on the master test sheet. When this occurs the leading tester records the deviations on a blank sheet.

* * *

AFTER completing the tests on the whole batch and recording any deviations, the sheet, bearing all details, is checked by the Superintendent.

* * *

IN the preparation of these master test sheets, the requirements given are such as to ensure that the material, if conforming to these requirements, will be acceptable to the customer. Deviations from these requirements, however, might still be acceptable to the customer provided that:—

(i) The number of coils involved is not large.
(ii) The amount of deviation is not excessive.
(iii) The customer be aware of these deviations.

* * *

FOR instance, an order may call for 10 tons of No. 14 gauge Bright Steel Spring Wire in 1 cwt. coils, this is noted when the master test sheets are being prepared and recorded as a requirement of the order. Supposing, through any cause, during the process of the manufacture of the material, that ½ ton has been produced in coils weighing ½ to ¾ cwt. the customer would, in all probability, be quite happy to accept this ½ ton, as the proportion of material failing to satisfy the requirements would be small.

* * *

AFTER examination of the test sheet bearing details of the deviations from the requirements,

it may be possible to approve part, or all, of this material for despatch.

* * *

THE main point is, of course, knowing just how much material is involved and the exact reason for its being rejected.

* * *

IN some cases, which are doubtful, it may be necessary to contact the customer through the Sales Department, advising them of the deviations from the requirements and asking them if they are able to accept the material. There are also instances where wire fails to conform to requirements and the degree of its failure is such as to make it quite unacceptable for the order.

* * *

Link up with Production Department

THE link up of the Inspection with the Production Department takes the form of advising the Production department of all rejections — whether or not they have proved acceptable to the customer.

* * *

BY knowing when the material has been found faulty the Production Department is able to adjust its method of production of the balance of that particular order.

* * *

IT may be that the balance of an order requires adjustment in the method of production to ensure more satisfactory results — or, if the degree of fault has not been high and the material has been accepted, the point may require noting, so that better results may be obtained in future production of this class of material. This link up is carried out by supplying all test sheets which bear details of any rejection to the Production department for examination so that the results of their work can be studied.

* * *

CONSEQUENTLY, it follows that if the Production Department is advised of the despatch of an order without any reference being made to it by the Inspection Department, the whole of that material has been found satisfactory.

Despatch Department

THE Warehouse has to be capable of handling a variety of sizes, weights and qualities, as well as packing and bundling material by numerous methods.

* * *

THE work of the Department is subdivided into various sections to enable control and supervision to be more easily exercised.

* * *

VERY generally the work involved is:—

1. Packing or bundling.
2. Weighing and labelling.
3. Despatching.

* * *

A Warehouse Superintendent is in charge of this department and the following divisions are made in the personnel:—

1. Leading Warehousemen.
2. Packers.
3. Loaders.

* * *

THE packers and loaders are divided into two groups each group being headed by a leading warehouseman.

* * *

THE leading warehousemen coordinate the work of the members of their respective groups and obtain information as to the exact weight and number of bundles after the packing operation has been completed.

* * *

THE Warehouse floor space is divided into three areas. One for the reception of material from the Inspection Department. One in which the packing, weighing and labelling operations can be carried out. One for storage space for finished material awaiting collection by transport services.

* * *

THE Warehouse, as already explained receives all wire for packing and despatching from the Inspection Department after this latter section has approved it as conforming to specification. The wire is conveyed to the Warehouse through the medium of the Internal Transport and each batch of material has with it an identifying label on which are given details of order number, size, quality and approximate quantity.

* * *

THE Warehouse Superintendent receives a Works Order copy for every order immediately it is issued by the Sales Department, and these Works order copies are endorsed with any particular packing details such as:—

1. Whether the material has to be sent in separate bundles or packed in cases.
2. Whether the material has to be wrapped in any special manner.

* * *

THE order also contains details as to what method of transport has to be used to deliver the material to the customer. From this information the Warehouse Superintendent can, therefore, when the time arrives for the material to be packed, issue directions to the leading Warehouseman as to what methods and materials are to be used.

* * *

AFTER the packing has been completed the material is weighed by the leading Warehouseman, labelled and then placed in the storage section awaiting final delivery to the customer.

* * *

THE Superintendent enters in his records the quantity which is ready against each order. Arrangements are made by him for collection by a transport service of the material for delivery to the customer when either:—

1. The order is complete
or 2. Sufficient quantity is available to make a partial despatch.
or 3. The customer urgently requires all that is available.

* * *

THE foregoing is a general picture of the flow of the Warehouse work, and I would now like to consider various important points which arise in that flow.

* * *

Packing and Bundling

MATERIAL going through the various stages of manufacture has only sufficient fastenings on it to enable it to be held together

(*Continued on page* 346)

Corronizing Processes

Developed by Standard Steel Spring Company
Coraopolis, Pa.

THE protection of steel articles against corrosion is, of course, a problem which has been present since the beginning of steel manufacture. The constant attempt of the steel to return to its original constituents is always present under varying circumstances. At best the corrosion of steel articles can be delayed and provision made to assure articles which are useful for longer periods of time. There are numerous methods and ways of protecting steel articles, among which are spray coatings, dipping, electroplating, galvanizing, enamelling, painting, oxide coatings, phosphate coatings, chromate coatings and hot metal coatings. Each of these types of coatings have characteristics which recommend them for certain fields and in which they are very efficient.

* * *

THE **Corronizing** processes are not new and have been in use since 1938. These processes fall under the heading of the electroplated coatings. As such there are two divisions of the Corronizing processes, namely the **nickel zinc** process and the **nickel tin** process. Each of these two processes are similar in the respect that the metal which is deposited on the steel article is nickel and that the subsequent duplex coating is heat treated to obtain diffusion. In the case of the nickel zinc Corronizing process, zinc is deposited on the nickel and subsequently the entire article is heated to obtain diffusion. In the nickel tin process tin is deposited on the nickel and the article heated to obtain diffusion. The use of nickel zinc and nickel tin Corronizing processes on screen wire, wire and wire products of all kinds has been proved over a considerable length of time. These commodities are especially suited to the use of the Corronizing process because of the readiness of wire to be electroplated. High current densities and minimum space are the advantages of wire as regards the Corronizing process. **Standard Steel Spring Company** at Coraopolis, Pa., is the sole owner and licensor of the processes and grants to reputable companies licenses to practice either or both the nickel zinc and nickel tin processes.

* * *

The Nickel Zinc Process

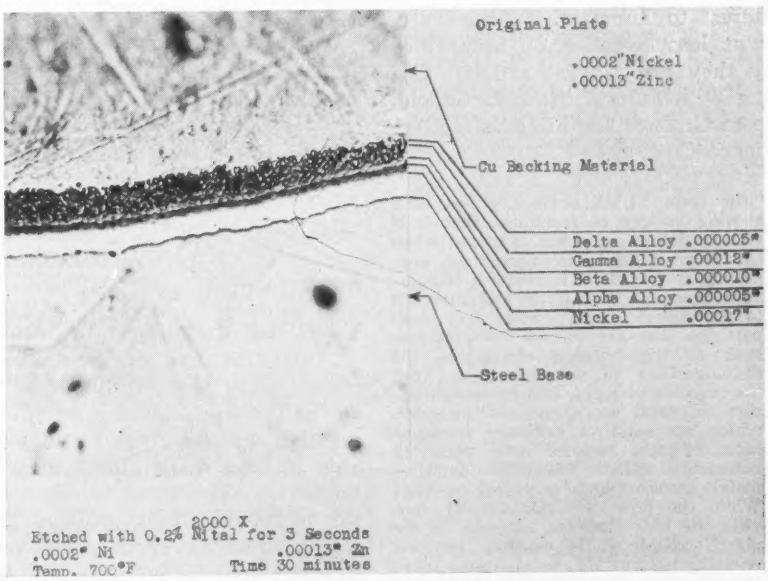
THE **nickel zinc** Corronizing process consists of depositing nickel on steel as noted above and depositing zinc on the nickel coat and then heating it to a temperature of approximately 700° F. for times ranging from 3 minutes to one hour depending upon the method of heating and the size and shape of the article which has been processed and the thickness of the nickel and zinc coats. After proper heating of the article which has been coated, a series of alloys are formed in the protecting coating which are as follows:

BEGINNING at the base metal steel there is a layer of nickel. Next to the nickel layer outwardly there is an alpha alloy, whose composition is 90% nickel and 10% zinc; outwardly from the alpha alloy is a beta alloy whose composition is 48% nickel and 52% zinc; outwardly from the beta alloy is a gamma alloy whose composition is 20% nickel and 80% zinc and outwardly from the gamma is a delta alloy whose composition is 12% nickel and 88% zinc; outwardly from the delta is a very light coating of free zinc which may be 100% zinc. The accompanying photomicrographs of the structure of such a Corronizing coating shows the alloy formations.

* * *

EACH of the alloy formations exhibit individual physical and mechanical properties. It is to be noted that the nickel zinc Corronized coat is far less noble on the outside than on the inside and

(*Please turn to page* 343)



Photomicrographs of the structure of a Corronizing coating showing alloy formations. * *

The Fume Problem

Kinds of Fumes

By Wallace G. Imhoff, President

Wallace G. Imhoff Co.,
Los Angeles, Calif.

Part I

A discussion on the extremely complicated Fume Problem. To be published in two parts.

The Fume Problem Extremely Complicated

VARIOUS industries, and industrial processes and operations produce what have been segregated under one name and called "fumes". Not very much seems to be known about these "fumes", or just what affect they have on the human system. The purpose of this discussion is to identify the "fumes", show what causes them, and explain why from both a health and economic standpoint, it pays to eliminate the "fumes" that can be eliminated; reduce those in volume that can't be entirely eliminated; and control those "fumes" that are definitely known to be an occupational hazard.

* * *

What are Fumes

BEFORE attempting to discuss the different kinds of fumes, it is of interest to know what fumes are, or at least what some authorities say they are. In his article, "Coping With Fumes", **R. J. Littlefield**, Research Engineer, Mine Safety Appliance Co., says —

"The term FUME ordinarily has such a wide variety of meanings that it is well to define just what is meant when the term is used. In discussions pertaining to industrial hygiene, it is common practice to confine the meaning to atmospheric dispersions of very small particles that are formed by processes such as the burning of metals, the decomposition of substances by heat, the reaction of gases, and the condensation of gases or vapors of materials which are solid at ordinary temperatures. Fumes include some materials commonly called SMOKES, such as metal smokes and arsenical smokes. While the term SMOKE usually conveys the idea that the material in the air is visible it is possible to have enough present to be harmful even though there is not enough to form a visible cloud."

E. R. Holden, Ph. D., in the same trade journal, December 1938, page 27, under the title of "FUME PROTECTION" states —

"Fumes are generally distinguished from dust and smoke by two criteria, namely — method of formation and particle size. Processes handling metals at high temperatures produce fumes, the particle size of which will generally vary between 1/25,000th and 1/125,000th of an inch in diameter. This size is larger than most smokes and smaller than most dusts.

Such finely divided material will remain floating in the air of a workroom for long periods of time unless it is caused to clump together or unless it is removed by natural or artificial means. This fact leads to a longer time of exposure during which the material may be absorbed by man than will result with most dusts.

Fumes may produce transient diseases such as metal fever which rarely lasts for over twenty-four hours or they may cause serious impairment to health. The study of the potential health hazard involved in any process where fumes are present is divided into three phases, the chemical analysis of the workroom atmosphere, the medical and bio-chemical study of the exposed workmen, and the engineering control of harmful conditions."

* * *

Kinds of Fumes

WHILE the subject of "fumes" at this time will be discussed mainly from the standpoint of the dip galvanizing industry, very brief mention will be given to all available information at hand in other industries. The fume problem is a far more important problem than most industries realize. Its ramifications are vitally concerned with the health and the welfare of the worker; with the damage to buildings both belonging to the company and in the nearby neighborhood; to the total lost time due to sickness, and staying at home because of feeling badly; to the damage to machines, equipment, and work in process standing in the fumes; and finally to the damage to the morale of workers because of destruction of their clothes, continued colds, sores, and many other very disagreeable features, all of which affect morale.

* * *

SOME of the kinds of fumes as classified by industries are listed below —

Alkali Cleaning fumes
Pickling fumes
Galvanizing fumes
Fluxing fumes
"Dusting on" fumes
"Burning off" zinc fumes
Sal-ammoniac fumes
Zinc coating repair fumes
Welding galvanized iron fumes
Cutting fumes at time of pot failure
Combustion fumes
Stripping fumes
Zinc fumes
Lead fumes
Cadmium fumes
Tinning fumes
Degreasing fumes
Plating fumes
Brass pouring fumes
Shipwelding fumes
Foundry fumes

* * *

THESE are but a few kinds of fumes; fumes of one kind or another are found in many industries. Fumes can also be classified as operational fumes such as the following: —

Cleaning
Degreasing
Pickling
Stripping
Fluxing
Dusting on
Galvanizing
Welding
Coating repair
Tinning

A more orderly, and a much more scientific classification of fumes is to classify them as to process fumes. That classification not only tells more about the fumes, but is an intelligent approach to identifying the kinds of fumes, and when that is done, it is a big step in controlling and eliminating fumes. Therefore, the discussion will continue along this line of thought and study of fumes.

* * *

Steam Vapors

STEAM vapors which apparently seem absolutely harmless in so far as fumes are concerned, do have a very vital affect on the worker and on working conditions. In one plant, the pickler, was overcome and fell into the pickling tank of boiling sulphuric acid. Needless to say he met a horrible death; he was overcome by the hot humid atmosphere of the pickling room caused mostly by steam vapors and acid fumes. So while in themselves steam vapors are harmless, the conditions they produce are detrimental to the welfare of the workmen when creating very hot humid atmospheres in the pickling room.

* * *

Alkali Cleaning Fumes

THERE are many alkali cleaners on the market as commercial metal cleaners. The equipment is usually a commercial cleaning solution and a hot water rinse bath; both are most efficient when operated at about 180 to 200 degrees F. Here again we have the problem of steam vapors along with the alkali. As a general thing these vapors are considered harmless, and seldom cause any discomfort to the operator.

* * *

Pickle Fumes
Acid Fumes

(a) Sulphuric Acid Pickling Baths

THE fumes from sulphuric acid pickling baths have long been the subject of many fume discussions and technical papers on fumes. These fumes are mainly steam vapors, acid spray, hydrogen gas developed from the action of the acid on the base metal, and in former days when some acids carried arsenic, arsine gas was often present.

* * *

THE most important cause of pickle fumes is due to too small a pickle capacity, which means the tanks are too small in size and there are not enough of them. In order to maintain the required speed of production when the pickle capacity is too small, the acid strength has to be higher, and so does the bath temperature to shorten the pickling time. Both of these control factors are the cause of very atrocious, vicious pickle fumes. Bad fume conditions indicate clearly that the pickle capacity is too small. The first remedy is therefore very obvious, more pickle tanks and larger tanks if it will improve operating conditions.

* * *

FUME conditions in pickling departments are affected very greatly by weather conditions. In the summer many departments are fairly clear, but with the approach of fall and winter, especially during the rainy season of both spring and fall, fume conditions may be extremely bad. This is particularly true in plants where the fume condition is aggravated by too small a pickle tank capacity, and not enough tanks.

* * *

THE ever growing importance of understanding the broad aspects of the fume problem is perhaps best illustrated in the case of BOAL vs. ELECTRIC STORAGE BATTERY CO. (Circuit Ct. of Appeals — 3rd District — Pennsylvania) 96 Fed 2nd 815 (August — 1938) which is as follows —

"CANCER FROM SULPHURIC ACID MIST; IGNORANCE OF HAZARD NO EXCUSE"

"A negligence action brought to recover damages for a cancer of the lip caused by the presence of sulphuric acid fumes in a storage battery plant, was held by the Federal Circuit Court to be proper. In answer to the contention that the employer did not know that the fumes could result in cancer, the court stated: "Where scientific knowledge was available respecting sulphuric acid mist as it was found in employer's plant, employer was chargeable with negligence in failing to provide precautionary measures, irrespective of actual knowledge of danger'.

"The court suggested further, that there were various publications and persons from which and whom the scientific information could have been obtained, if proper inquiry had been made."

* * *

SOME of the other human hazards from abominable pickle fume conditions are colds, pneumonia, breathing trouble, black teeth, pickle sores, and general weakened condition. The one sure remedy with the best results toward eliminating and reducing the fume condition, is increased pickling capacity, which permits operating at lower temperatures and lower acid strengths.

* * *

(b) Muriatic Acid Pickling Baths

THE introduction of the liquid flux technique in favor of elimination of the muriatic acid dip, has greatly reduced the fume problem from muriatic acid. However, there are still many plants that use a strong, hot, muriatic acid pickle, and these plants have the fume problem as a very vital and important problem to solve. Muriatic acid fumes, especially from strong, hot, pickling baths, are extremely vicious, choking fumes. From the standpoint of working conditions these fumes are much more obnoxious and more irritating than the fumes from sulphuric acid pickles. The fumes are hot steam vapors carrying muriatic acid spray. Violent choking and coughing result from these strong fumes, and this type of fume is most abominable to work in.

* * *

MURIATIC acid fumes attack the delicate membrane of the nose and throat, and in the winter time make the human hazard of catching cold, or pneumonia very likely. This type of fume, especially in atmospheres of high steam vapor, also penetrates the clothing, and unless the clothing is kept very clean by washing every day, pickle sores, scabs, and abcesses, develop during "sweating" in the humid atmosphere.

(c) Hydrofluoric Acid Pickling Baths

IN the vitreous enamel industry and the glass industry, and industries where glass has to be etched to frost it, a pickling bath of hydrofluoric acid is required because this acid is the only acid that will attack and dissolve sand or silica. Hydrofluoric acid is used in pickling coatings, and also in many plants pickling steel covered with scales carrying silica. The hydrofluoric acid dissolves and breaks down the silica which then permits the sulphuric acid to dissolve the scales and iron oxides. This acid is also used for stripping enameled coatings that are defective.

* * *

SOME idea of the fume hazard from this acid may be obtained from two illustrations. In a company doing vitreous enameling the plant was two blocks away from the office. The hydrofluoric acid pickling bath was used in the enameling department. The wind usually blows toward the west in the direction of the office, and on the west side of the office every window glass is so badly frosted that it is impossible to see out of the window. The fumes did this damage after being carried two blocks by the wind.

* * *

IN another plant an old time pickler who had risen to become Superintendent of the enameling plant was requested to strip off the coatings from some defective articles. He had never handled hydrofluoric acid, and although repeatedly warned about being burned with it, was very careless in stripping the articles. By almost a miracle his fingers were saved, but all of his fingers on both hands were so badly burned that they had to be treated for over six months, and he narrowly missed having them all amputated from infection and the penetrating burns from this acid.

* * *

(d) Nitric Acid Pickling Baths

NITRIC acid is used in pickling brass and copper and some special steels. Heavy red poisonous fumes of nitrous oxide are given off with this acid, and every precaution should be taken to carry off the dangerous fumes that develop when using this type of a pickling bath. The fumes are so vicious and so poisonous, that it gives out its own warning to be extremely careful when pickling with this acid.

* * *

Flux Fumes

IN the old flux technique muriatic acid as a dip flux was used both hot and cold. There are almost no fumes from a weak cold muriatic flux dip, but if as used in some plants up to 15 to 20% strength, then there is a strong fume from the acid solution. In plants where the flux dip is used hot then mild to very strong muriatic acid fumes may be given off, and muriatic acid gives off very obnoxious, choking fumes. With the hot flux technique steam vapors are also given off.

* * *

WHEN the liquid flux technique with zinc ammonium chloride is used, the fumes are largely steam vapors. This tank is generally operated at 180 to 200 degrees F., and at that temperature steam vapors are of course present.

* * *

Dryer Fumes

THERE are no fumes from the closed type of dryers, but sometimes open gas jets are employed, and in some plants where the old coke-fired galvanizing furnaces are still in use, the drying operation is done by moving the combustion chamber covers. This of course permits carbon monoxide fumes to escape into the galvanizing room. However, the coke-fired furnaces are being largely replaced by more modern gas, oil, or electrically-heated furnaces. Heat fumes may come from many types of dryers, but of course they are harmless, and in the winter time are even welcome as a means of supplying heat to the galvanizing department.

* * *

Galvanizing Fumes

GALVANIZING fumes may be divided as follows —

(a) Steam vapors
(b) Fluxing-on-pot fumes
(c) Dusting-on fumes
(d) Aluminum fumes
(e) Zinc fumes
(f) Lead fumes
(g) Cadmium fumes
(h) Combustion fumes
1. Coke furnaces
2. Gas furnaces
3. Oil furnaces
(i) Dressing fumes

* * *

(a) **STEAM vapors** — steam vapors may be caused in two ways —the steam arising from the slow immersion of wet fluxed articles into the galvanizing bath, and second, the steam vapors always present in the fluxing action as the wet articles go down through the flux into the galvanizing bath.

* * *

(b) **FLUXING-ON-POT fumes** — are all fumes derived from the chemical reactions that take place in the flux box. The flux is sal-ammoniac, or zinc ammonium chloride. The fumes developed in the fluxing reactions are hydrochloric acid gas (muriatic acid vapors), ammonia vapors, ammonium chloride vapors, hydrogen gas, and steam vapors. It is not believed that any zinc fumes, or zinc oxide fumes are developed in the fluxing reactions.

* * *

BOTH **ammonia gas** and **hydrochloric acid gases** can easily be recognized by their smell in the fluxing reaction. There is probably some of the ammonium chloride that is volatilized, as evidenced by the bluish and whitish vapors given off at times. Hydrogen and ammonia gases can readily be detected by both smell, and by the blue hydrogen flame when the salt is burned on the bath. The flux must always carry water, so that steam vapors are always present. Hoods are always provided for carrying off these fumes, so that they do not harm the operators.

* * *

(c) **DUSTING-ON fumes** — these fumes are very obnoxious, and are the hardest to control. The dusting-on material is called "white fines" in galvanizing language, but

its technical name is the pure white fine sal-ammoniac, or ammonium chloride. Much research work has been done to find another material that could be used in its place, but so far all efforts have failed. The purpose of "dusting-on" this white sal-ammoniac over the liquid zinc coating before it sets, is to cleanse the metal of oxide, scruf, and dirt from the bath surface, make the metal flow easier by the removal of these oxides and dirt, give a smooth quick run-off metal, and develop a clear bright metallic finish to the coating metal. Most of the salt, sal-ammoniac, is vaporized and turned into a heavy white fume as it is dusted against the molten zinc surface of the articles as they are withdrawn. At least three kinds of fumes are present — ammonia fumes, hydrochloric acid fumes, and ammonium chloride. They represent all the parts of the original salt which may be partly decomposed by the chemical reactions taking place. No way yet has been devised to control these fumes other than to carry them off by using a hood over the galvanizing bath. No other salt has yet been found to accomplish the same results, and since this operation is absolutely necessary, the only solution to this fume problem is to use a hood over the bath, and this is not possible in some fields of galvanizing.

* * *

(d) **ALUMINUM fumes** — in standard galvanizing practice it may be said there are no aluminum fumes developed in galvanizing. The aluminum content in any galvanizing bath is always extremely small, a fraction of 1 per cent, and excess aluminum is ordinarily seen in the blue ashes that form on top of the galvanizing bath. Zinc oxide is yellow; aluminum oxide is blue. It can be easily distinguished from the zinc oxide skimmings by its crummy character as compared to the powdered oxide of zinc.

* * *

THE only time any aluminum fumes are developed in standard galvanizing practice is when someone, not experienced in adding this metal to the bath "as a brightener", gets too much aluminum in the bath. Then the aluminum has a stronger affinity chemically for the chlorine in the flux salt, and instead of forming zinc chloride, aluminum chloride is formed, and this is a gas. Anyone who adds too much aluminum to the bath will quickly find out that it is impossible to hold a slag flux on the bath because the chlorine goes off as aluminum chloride instead of remaining to make up the flux of zinc chloride, which is necessary in galvanizing. There is no aluminum fume problem in galvanizing because it is a rare occurrence to have too much aluminum in the bath.

* * *

(e) **ZINC fumes** — every so often some one who is not too well supplied with technical information, and may have a definite purpose in view for creating trouble, starts a rumor about the very harmful zinc and lead fumes that are in galvanizing departments. Twenty five years ago when such rumors went around widely, it was stated by some galvanizers that as high as 15 to 20% of metal was lost by evaporation. They backed up their statements with samples of zinc oxide taken from the rafters above the bath surface. The information obtained was so erroneously applied that in some localities laws were passed to prohibit putting lead in a galvanizing bath, and yet if these same authorities had taken the trouble to read some of the scientific literature on "zincs for galvanizing" they would have discovered, that practically all zinc ores carry lead ore, and that this lead comes down with the zinc when smelted. Recognizing this fact that most zincs naturally carry up to 1.00 per cent or over of lead, the American Society for Testing Materials in its Standard Specifications for Slab Zinc for hot dip galvanizing, set an upper limit of 1.60 per cent lead content as acceptable in slab zinc for galvanizing.

* * *

THE outcome of this early confusion about zinc fumes from galvanizing baths became the subject of a research investigation which definitely proved that there is no loss whatsoever by exaporation of zinc in galvanizing. It was finally agreed by the person submitting the zinc oxide from the rafters over the bath, that this oxide was carried up by the heat currents from the bath, and that it was just the normal oxidation product formed on the surface of the bath when the molten zinc came in contact with the air. Careful tests definitely proved that there is no metal loss due to evaporation or zinc fumes formed in galvanizing.

* * *

(f) **LEAD fumes** — it is unfortunate that some uninformed persons outside of the galvanizing industry, and knowing nothing about the use of lead in the galvanizing bath, should be able to create such false and harmful impressions in regard to the role that the metal lead plays in galvanizing. This is to refute and brand such information as absolutely false, and to definitely state that those responsible for spreading this misinformation as to lead poisoning, lead fumes, etc. in galvanizing, are in complete ignorance of the role of lead in the galvanizing bath. From the very beginning of galvanizing which dates back over 100 years, zincs carrying lead, have been used as the coating metal. Lead is not only **not harmful** in galvanizing, **but very beneficial.** It lubricates the zinc, makes it more fluid, gives the zinc coating a beautiful finish, and tends to give the smoothest, lightest, and best zinc coating. Excess lead stays at the bottom of the pot, and the galvanizing bath seldom carries over 1.00 per cent lead. It can be very definitely stated from research investigations that there are no lead fumes in galvanizing, and that the metal lead is very beneficial in maintaining the high quality of the zinc for coating purposes. This erroneous information regarding lead in galvanizing has probably been derived from other smelting operations where lead is burned in large quantities, and the fumes are dangerous. Lead boils at 1620 degrees C. (2948 degrees F.) The average galvanizing bath operating temperature is about 850 degrees F.,

WANT FASTER C

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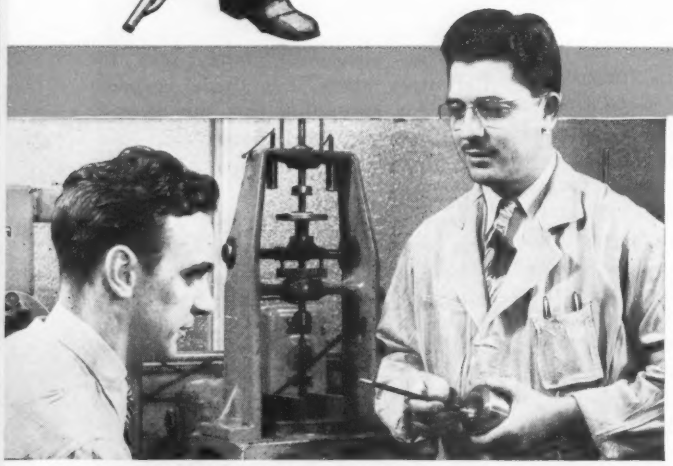

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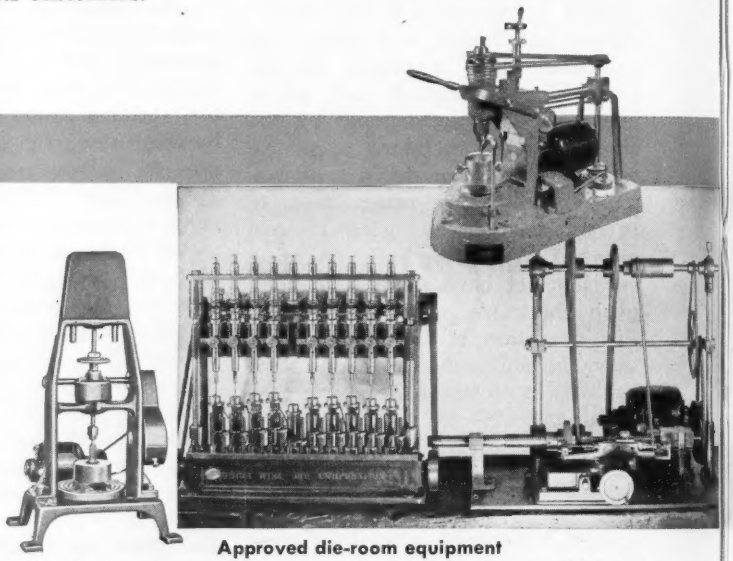

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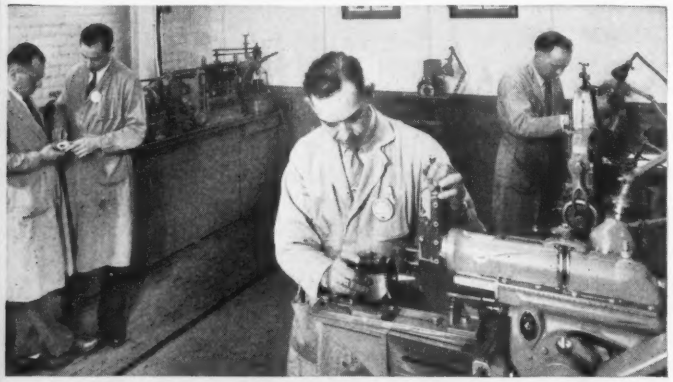

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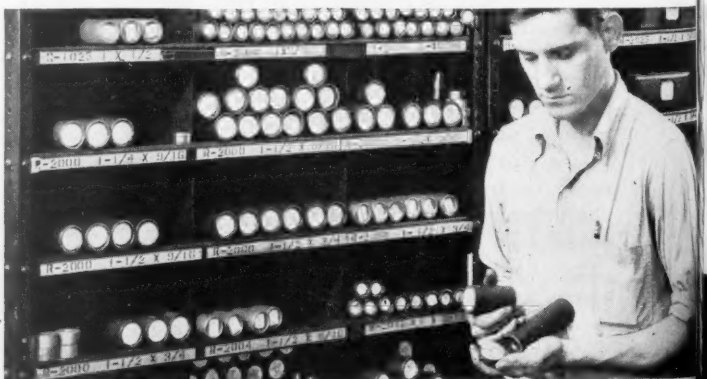

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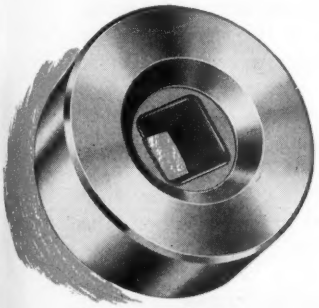
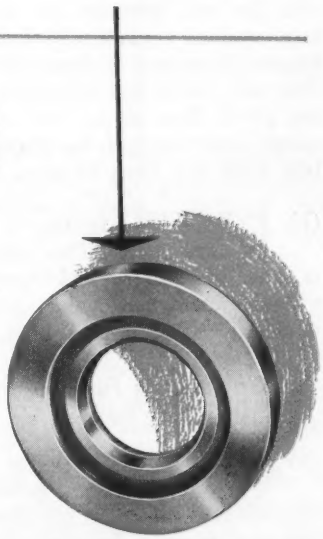
11171 E. 8 Mile Street, Detroit 32, Michigan

These are part of the large stocks that help bring you faster service



Sizes up to 3" O.D.

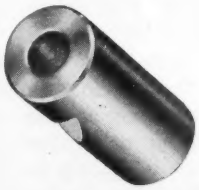
The quality of Carboloy Dies for drawing tubing and bars is as outstanding as that of our wire-drawing products. Here's a bar die that will live through a heavy run. Bar dies like this one are made by Carboloy in sizes up to three inches.



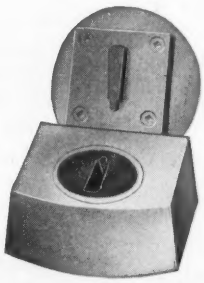
Sizes up to 6½" O.D.

Standard guide ring

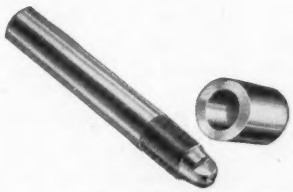
Because of their long life and accuracy, Carboloy Cemented Carbide dies are a must where a long run is anticipated or close tolerances are required. This tube die and other Carboloy dies for drawing tubing come in sizes up to six and a half inches.



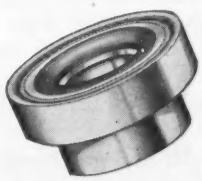
Standard extrusion die



Formed die and punch



Standard mandrel and mandrel nib



Special round-hole die

Specify CARBOLOY® CEMENTED CARBIDE for Complete Package Die Service

and lead in the bath is usually under 1.00%.

* * *

(g) **CADMIUM fumes** — most zincs carry a very small amount of cadmium, except the secondary zincs made from materials that do not carry any cadmium. Zinc ores carry both lead and cadmium ores, and the cadmium comes down with the zinc in the higher grades of zinc. Prime Western zinc, the last draw, may not carry only a trace of cadmium, but modern galvanizing practice introduces cadmium up to 0.10 to 0.25 per cent for brightening and finishing purposes, and for thinning out the galvanizing bath, and giving a good clean coating metal. It is found in zinc for galvanizing in such extremely small quantities that there is no fume problem from cadmium. A number of metals exists as impurities in zinc, or are added to zinc for one purpose or another, but none of them have ever been known to create a fume problem. The zinc itself has a higher melting point than either lead or cadmium, and there is no fume problem with the bath of zinc.

* * *

(h) **DROSSING fumes** — there are none. This operation is one of the normal operations of galvanizing, so it has been included for the record's sake.

* * *

Galvanizing Furnace and Pot Fumes

(a) **COMBUSTION fumes** — the old coke-fired galvanizing furnace was the worst offender from pot and furnace fumes because of the carbon monoxide fumes from the coke. The furnace design and construction was such that at times the monoxide fumes were very bad. Other fuels and better furnace designs are slowly replacing the old coke-fired galvanizing furnace.

* * *

(b) **OIL and gas fumes** — when these are present it is a sign or indication that the galvanizing furnace needs repair, or that somewhere in the combustion equipment, or flues, etc. that they have been stopped up by a burned out damper, fallen wall, or similar thing that is disturbing the normal removal of the burned gases from the combustion chambers and out to the stack.

* * *

(c) **POT failure fumes** — zinc oxide from burning molten zinc may happen for a short time during pot failure. In the old coke-fired pot the zinc ran out into the combustion chambers and some of it was burned before the flow could be stopped. In other fuels the pot failure may throw some of the metal down into the hot combustion chambers and flues for a time, but these occurrences are rare.

* * *

OCCASIONALLY the pot failure may be such that considerable good zinc will be left in the pot, and what has run out may run for some distance. Because of the mass of metal, and the heat being carried off too quickly, zinc that has gotten loose cannot be cut up with a blow torch. The flame temperature is so high that the zinc burns to heavy oxide fumes; the best way is to cut it with sledges and cutters, break it with bars and wedges, and pry it loose with crowbars. Heavy zinc oxide fumes are developed when an attempt is made to cut up this loose metal with a torch. The same holds good for getting the frozen zinc out of the galvanizing pot. The best way is to use a paddle and splash, or open a ditch across the pot to the bare metal bottom. Then cut the pot in half with a torch. Once the pot has been cut in half then the good metal in the bottom can be gotten loose with the use of wedges and bars and sledge. Zinc will contract anyhow from the pot sides and bottom, and this is the most practical method of reclaiming the lost metal.

* * *

(d) **POT repair fumes** — occasionally pot failures will occur high enough up to make it worth while to repair the pot. In order to get the absolute minimum development of zinc oxide fumes all the alloy should be removed around the point of failure. The zinc-iron alloy is brittle and hard, and has an expansion and contraction different from the steel in the pot. It generally can be gotten loose very easily with a chisel. Welding should not be done until this alloy is removed. Some zinc fumes will of course be present during the welding and repair.

* * *

"Burning Off" Fumes

YEARS ago, and still in a few galvanizing plants they have an operation known as "burning off the zinc ashes". The oxide skimmings are collected in barrels during week run, and then on Saturdays a man puts the ashes, or skimmings on the galvanizing bath, throws sal-ammoniac over them after they are hot, and works and stirs them up mixing in the salt with the ashes. This creates a gas which is ignited with a match, probably hydrogen and ammonia gases, which burns hotly and melts up the metallic particles of metal in the skimmings. After working over some time the most of the good metallic have been melted up and gone back into the bath, leaving a dark olive green powder which is mostly zinc oxide with small zinc shot in it. This "burning off" operation creates very heavy fumes, and for that reason is usually done when the shop is not working.

* * *

Stripping Fumes

THIS operation is an extremely obnoxious one from the fume standpoint unless modern inhibitors and foam blankets are used to suppress the hydrogen and acid spray fumes. The tank is sometimes set entirely outside, but usually the stripping tank is in the pickling department. Articles that have defective coatings, bare and exposed steel spots, etc. are stripped to be regalvanized, and in malleable iron fittings plants where racks or rakes are used, these have to be stripped every so often to clean them of the zinc-iron alloy that forms on them from constantly being in the galvanizing bath. Stripping fumes are extremely obnoxious if not properly handled. The fumes are steam vapor, hydrogen gas, and acid spray.

* * *

Repair Fumes

IN some plants it is necessary to repair work that has already been

(*Please turn to page* 340)

LABOR RELATIONS

by John B. Stone,
Washington, D. C.

The twelfth of a series of articles on the subject, with particular reference to problems of the wire and wire products industry. The author is a noted authority on the subject.

Labor Relations

AS negotiations between big industry and big unionism over wage increases approach the show down stage, it appears from "significant straws in the wind" that individual industrialists must make a choice which may have even more far reaching importance than pay hikes.

* * *

THIS choice is whether to "take full advantage" of the Taft-Hartley law or conduct negotiations with union representatives outside the new law.

* * *

IT is a choice that must be made by small and medium sized plant owners as well as big steel and big electrical equipment and it is one which will confront business men in the wire and wire products field with sharp urgency.

* * *

THE months which have passed since Congress passed the Taft Hartley Act over President Truman's veto, have witnessed the working out of definite techniques for taking advantage of the law.

* * *

ONE method is clearly exemplified in the Cleveland case involving the International Association of Machinists, the huge un-affiliated union which was among the first unions to comply with the affidavit requirement of the act.

* * *

IN this case IAM members went on strike and the company against whom they were striking employed non-union members. Under the new rules of the Taft-Hartley Law, the company was enabled to call for a representation election and to include the new workers, hired after the strike, in the voting.

THE advantages of this technique to a management which wants to break the hold of an established union upon its plant or plants need no explanation. They speak for themselves.

* * *

THE second technique which is expected to be used in cases where unions have failed to comply with the requirement of the new law which calls for filing of "non-Communist" affidavits by leaders of unions before they can qualify before the NLRB is best exemplified by the long drawn out strike of employees against the management of Government Services Inc. in Washington, D. C.

* * *

OF course the GSI is not related in any way to the wire and wire products industry since it is a semi-public corporation running cafeterias for Government workers. But since neither the United Steel Workers of America nor the United Electrical, Machine and Radio Workers have signed the anti-Communist affidavits, well informed observers see in the pattern on which the strike has developed, an indication of what can be done in either the electrical or steel industries when and if management sets out to bust the unions.

* * *

RELATIONS between management and the cafeteria workers union, part of the United Public Workers of America (CIO) have never been good. When the contract expired this year management refused to negotiate with the union until its officers had signed the affidavits. After the strike had been in progress some time, the local union officials resigned and new ones were elected. The new officers signed the affidavits.

* * *

AT this stage the management insisted that the thousands of new employees it had hired since the strike began were its real employees. It has so far refused any settlement which would involve firing the new employees.

* * *

IMPARTIAL observers agree that the union has been pretty badly beaten by GSI.

* * *

THERE is no question in the minds of veteran labor relations men that either of these techniques can work on an individual plant or city basis.

* * *

THE serious question involved in employing such tactics, however, is the question of retaliation by a strong national union. Here, too, observers agree that extensive use of such techniques against a strong national union might precipitate a bitter and wide-spread strike or wave of strikes.

* * *

MEANWHILE, without any notice from newspapers literally hundreds of labor-management cases have been negotiated and settled without calling upon terms of the Taft-Hartley law. Sen. Wayne Morse of Oregon pointed up this fact in a recent speech in the Senate.

* * *

IT is regarded by industrial and union leaders alike here, as most probable that at least during the present period of high profits and

(*Please turn to page* 350)

GOVERNMENT WIRE PRODUCTION INFORMATION

Microfilms of German Technical Documents

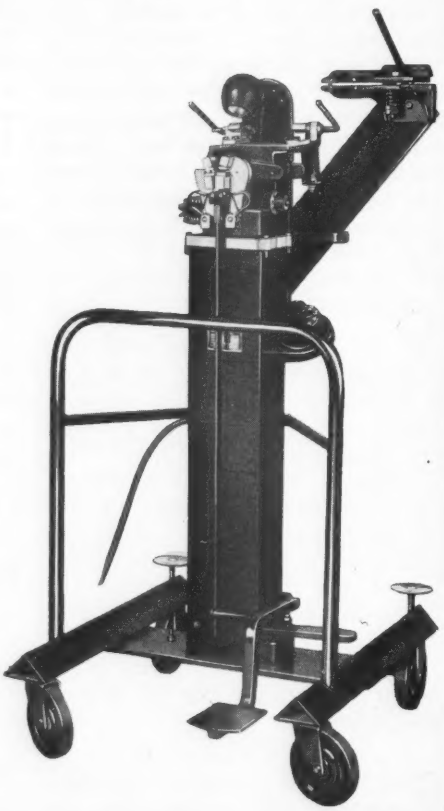
EARLY reports from American experts who are reviewing some 5,000,000 pages of German technical documents reproduced on microfilm reels indicate that the material contains the manufacturing details of many products, processes, and ideas of interest and value to American Industry, John G. Green, director, Office of Technical Services, Department of Commerce, said recently.

* * *

THE microfilmed documents were obtained by OTS technicians in Germany in the course of the post-war program to transfer German technological know-how to this country. Private industry is cooperating with OTS in searching the German language documents for data of immediate or potential value for American firms.

MICROMETER PRECISION — MICRO-WELD — TRADE MARK REG. U. S. PAT. OFF.

MODELS J-3-C and J-4-C AUTOMATIC



These welders are used for welding COPPER, ALUMINUM, and other non-ferrous wire ranging in size from .031" to .128" diameter.

The welding cycle on these welders is automatically controlled and completed by a single downward stroke of the foot pedal, which include the clamping of the wire being welded, contacting the welding switch, and applying the upset pressure on the weld. All units are equipped with annealing dies, filing vise, light, extension cord, and mounted on a 4-wheel truck.

MICRO PRODUCTS COMPANY

20 NORTH WACKER DRIVE, CHICAGO 6, ILL.

Telephone, State 7468

THE microfilm reels, Mr. Green explained, contain detail drawings, flow-sheets, minutes of the meetings of German technical societies, copies of German patents and patent applications, research laboratory reports, and the like. The material on the reels supplements about 2,000 reports on German wartime technology prepared for OTS by American investigators who visited Germany. Considerable amounts of original material not discovered or reviewed by the investigators is contained in the reels.

* * *

OVER 400 American firms and technical societies have shown their interest in the microfilmed documents by offering OTS the voluntary services of 1,500 technicians to evaluate the microfilm material, Mr. Green stated. Each microfilm reel is being sent to an evaluator qualified to review the subjects covered in the reel. The evaluator reviews the reel and returns it to OTS with a report which describes the type of information found on the reel and tells whether it is of immediate or potential value and to whom.

* * *

THE review and evaluation of the microfilm reels offers American firms vast new opportunities to apply German technology to their own production problem. Although the German microfilmed documents do not constitute "popular reading", they may well prove "must reading for the American firms which are counter part to the Germans from whom the documents were taken", Mr. Green believes.

* * *

FOR example, one of the volunteer evaluators, Dr. E. W. Cooke, American Cyanamid Company, New York City, on the microfilm reel he examined, found a German method for using lead cyanamide as a combination pigment and rust inhibitor. He reports that the method "should be very important". He also noted an "ingenious substitution of coal gas for hydrogen" in the processing of hydrogen chloride.

Dr. James T. MacKenzie, technical director, American Cast Iron Pipe Co., Birmingham, Ala., lists numerous metallurgical developments on the reel he examined as of immediate or potential value including the use of sodium silico fluoride as ladle addition to gain finer grain structure in steel castings, and the production of bimetals by centrifugal casting. An evaluator of Otto B. May Inc., Newark, N. J., has studied a microfilm reel on German dyes. "It is an important reel", he states. "The work (described) is of a practical nature. Many new compounds are synthesized and tested."

* * *

OTS cannot undertake to translate the microfilmed documents —even the important ones, Mr. Green said. Nor should these evaluations be regarded as definitive. "Our objectives," he explains, "are to have the important data on the reels spotted by experts and to make the availability of this data known to the industrial community. It will be up to private firms to undertake translation of the original German, if desired, and otherwise make practical use of the materials."

* * *

THE reports of evaluators are now being received, Mr. Green said. Announcements of important findings and the availability of the microfilm reels will be made periodically by OTS.

* * *

Government Reports

THE production of thermostatic bimetal is described in one of three reports on bimetal manufacture now on sale by the Office of Technical Services, Department of Commerce. Two other reports discuss the production of bimetallic strip and bimetal tubing.

* * *

THE thermostatic bimetal report, prepared by OTS investigator Helmich W. Boessenkool, vice-president of Metals & Controls Corporation, Attleboro, Mass, gives information on German methods and equipment used for bonding, rolling, annealing, slitting and pickling. Specifications of component metals used and of bimetals produced by two main manufacturers are included.

SPEED UP
Slow Nailing Jobs
with
SPOTNAILS*
made of
KEYSTONE WIRE

Spotnailers and Spotstaplers are fast and accurate—made to do difficult fastening jobs on hard woods, light metals and other materials that less specialized staples and nails will not penetrate.

The Keystone preformed staple wire used in Spotnails and staples is stiff and strong . . . uniform in cross-section and temper to withstand accurate forming. Maximum holding power is obtained by a specially developed galvanized finish.

Keystone wire is the choice of the manufacturer because of its high uniform physical properties necessary for precision craftsmanship.

We are proud that Keystone wire more than satisfies the exacting requirements essential to product quality and manufacturing efficiency. Whatever your industrial wire specifications, Keystone can normally supply it.

*Spotnails, Inc.
1218 Sherman Avenue,
Evanston, Illinois

KEYSTONE
MUSIC SPRING WIRE

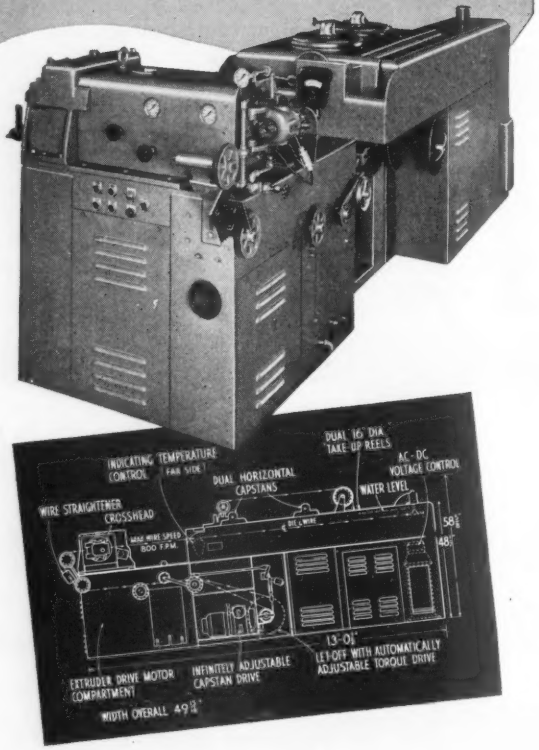
SPECIAL ANALYSIS WIRE
for all industrial purposes

KEYSTONE STEEL & WIRE COMPANY
PEORIA 7, ILLINOIS

COMPLETE PLASTICS

NRM

1½" Wire Covering Unit



CHECK THESE FEATURES

Only 13 feet in over-all length, this compact unit is completely equipped to cover small-gauge wire or cord at high speeds.

EQUIPMENT:

Double 16" take-ups, water cooling unit with dual, horizontal hauloff capstans, AC-DC voltage control, electric die heater, interchangeable cross-head, herringbone drive to extruder screw.

Write for complete descriptive literature on this and other NRM Plastics Extrusion Equipment.

NRM *Plastics Machinery Division*

NATIONAL RUBBER MACHINERY COMPANY

AKRON 8, OHIO

ONLY four firms appear to be engaged in this type of work, Mr. Boessenkool states, and their total annual production during the war years can be estimated at 85 tons. All manufacturers do their actual bonding by hot rolling but variations in the method of maintaining the relative position of the components during the bonding pass exist. The report describes all operations and contains several appendices which present coefficients of expansion and other properties of the standard German bimetals.

* * *

MIMEOGRAPHED copies of the 22-page report (PB-58444; **Thermostatic bimetal production in Germany)** sell at 75 cents.

* * *

THE two additional reports are: PB-7910 **(The production of bimetallic strip in Germany;** mimeographed, 25 cents; 9 pages) prepared by J. O. Hitchcock of the British Intelligence Objectives Sub-Committee is based on visits to the firms of G. Rau at Pforzheim and Heraeus Vacuumschmelze at Hanau. Rau's have made some bimetals using austenitic steels as the high expansion element, but they do not favor the use of chromium-containing alloys due to bonding difficulties, the report states. A brief description of Rau's method of making bimetals, and expansion characteristics are given. The method of manufacture used at Heraeus and an analysis of several bimetal strips made by the firm are included.

* * *

PB-17563 **(Bimetal tubing;** mimeographed, 25 cents; 7 pages) by Sam Tour, president and treasurer of Sam Tour & Co., Inc. of New York, N. Y., describes the production of copper and bronze-lined steel tubing by two different methods. One of these, the Osnabrucker method, consists of cold-drawing the two tubes one upon the other, steel outside, copper inside, and then heating the assembly to secure bond. Bonding results from the greater heat expansion of the copper tube inside the steel tube. The second method begins with fabrication from a solid rod to produce the tubing and is used at the VDM (Vereinigte Deutsche Metallwerke) plant at

Heddernheim. Briefly, the method is as follows: Soft steel bars up to 6 inches in diameter and about 12 inches in length are bored by ordinary means to a size 0.2 to 0.3 mm smaller in diameter than the final size required. A hardened steel plug is then pushed through the hole, using a hydraulic press, which smoothes the walls. The hole is then shot blasted with steel shot and a thin-walled (0.5 to 0.6 mm) copper tube with an outside diameter about 0.2 to 0.3 mm smaller than the size hole of the steel billet is then inserted. A bronze liner of proper wall thickness is then inserted. The report contains information on various modifications of this procedure.

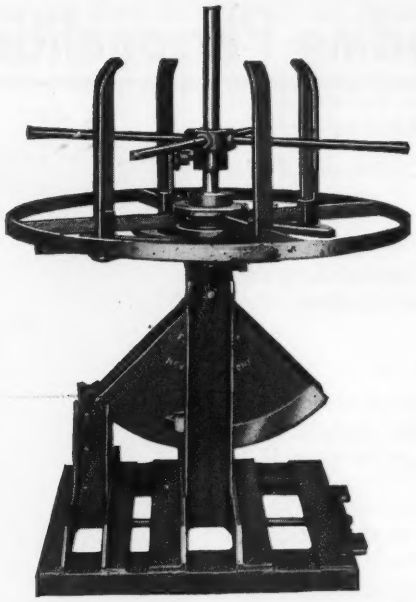
* * *

ORDERS for the reports should be addressed to the Office of Technical Services, Department of Commerce, Washington 25, D. C., and should be accompanied by check or money order payable to the Treasurer of the United States.

* * *

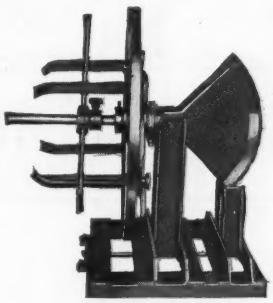
Standard Terminology Urged for Steel Fastener Industry

STANDARDIZATION of terminology and abbreviation for designating bolts, nuts, screws, rivets and so forth in the fastener industry is advocated by **Fasteners,** official publication of the American Institute of Bolt, Nut and Rivet Manufacturers. Fasteners gives recommended abbreviations for the various types of fasteners and points out that producers and buyers of threaded products will benefit from the adoption of a standard system of terminology for use on drawing, orders, invoices and stock lists. This standardized terminology compiled by producers should make the task of manufacturers and users easier. Many producers feel that a common set of abbreviations and phraseology throughout the industry will produce savings by providing understandable records and expending ordering, shipping and billing operations.



THE NEW, SELF CENTERING
UNIVERSAL WIRE REEL
(PATENTED)

Coils are centered automatically on this new, sturdily built Shuster Universal Reel. A quick, simple, lock nut adjustment positions wire perfectly. The reel, mounted on ball bearings, is equipped with an adjustable friction drag brake. Base is of welded steel. Counter balance enables one man to raise even the heaviest coils to operating position.



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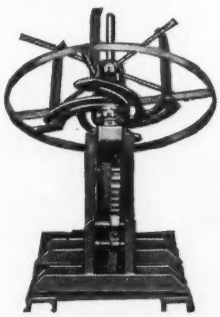


Angle Position

Simple adjustments permit use at any angle within 90 degrees as well as horizontal and vertical positions. The working level of the reel is also easily changed. By using a different type of spider, this Shuster Universal Reel can be used for flat stock in connection with power presses, or with automatic machines using ribbon stock. Takes coils to 300 lbs.

THE F. B. SHUSTER MFG. COMPANY, INC.
3102 MILL RIVER STREET, NEW HAVEN, CONN.

SHUSTER SINCE 1866
Automatic WIRE STRAIGHTENING AND CUTTING MACHINES

Outstanding Personalities of the Wire Industry

Firth-Sterling Adds to Staff

FLOYD Rose, Chairman of the Board, announces the recent appointment of **C. W. Iams, Jr.** as assistant to James W. Kinnear, Jr., Executive Vice President of **Firth-Sterling Steel and Carbide Corporation.**

* * *

MR. Iams is a graduate of Sheffield Scientific School, Yale University, 1933, and received B. S. degree in Industrial Administration in Engineering. His entire business life has been spent in the Pittsburgh area. He has had twelve years service with Carnegie Illinois Steel Corporation in the Industrial Engineering Department at Homestead, Clairton and Irvin. His position was Plant Industrial Engineer at the latter two plants. For the past four years he has served as District Industrial Engineer, Pittsburgh District.

C. W. Iams, Jr., Asst. to Executive Vice-President of Firth-Sterling Steel & Carbide Corporation

* * * * * *

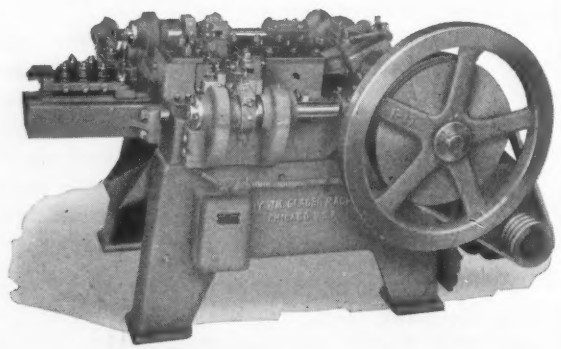
A. S. & W. Announces Appointments

APPOINTMENT of **H. H. Bullen,** veteran sales representative for **American Steel & Wire Co.,** to a newly-created sales responsibility covering 14 states, was recently announced by John Graham, general manager of sales for this United States Steel Corp. subsidiary.

* * *

MR. Bullen's new post is as manager of Western District electrical products sales, serving the states of Illinois, Indiana, Iowa, Wisconsin, Nebraska, Wyoming, Colorado, New Mexico, Minnesota, Montana, North Dakota, Missouri, and Kansas. He will continue to maintain his headquarters in Chicago.

GLADER HIGH SPEED WIRE NAIL MACHINE



MACHINE ARRANGED FOR INDIVIDUAL MOTOR DRIVE

High tonnage output, and low maintenance costs, have resulted in Glader Machines being accepted as standard equipment in every large nail mill built in the United States in the past twenty years.

Glader Machines are operating in most of the wire producing mills throughout the world.

These machines are made in eleven different types and sizes. This enables us to cover the range of sizes of nails produced with the greatest efficiency.

For further information please address,

WM. GLADER MACHINE WORKS

210 No. Racine Ave.
Chicago 7, Illinois

Export Dept.: 122 E. 42nd Street, New York 17, N. Y.

JOHN R. Gaut has been appointed assistant manager of Chicago district operations of **American Steel & Wire Co.**, subsidiary of United States Steel. **Nelson W. Dempsey** has been named general superintendent at Waukegan Works to succeed Mr. Gaut, while **Vernon L. Strohm** has been moved up to the position of division superintendent of wire mills to fill the vacancy left by Mr. Dempsey.

* * *

A native of Greensburgh, Pa., Mr. Gaut was awarded a B.A. degree at Williams College before starting work for American Steel & Wire at the Donora Steel Works in October, 1919. From his initial position as steel tracer, he moved rapidly upward through the ranks at Donora before being transferred in February, 1929, to Worcester, Mass., where he was made assistant department foreman in the round wire department at North Works. From January, 1940, to May, 1941 he performed special duties in the office of the vice president in charge of operations at Cleveland. He then was moved to Waukegan where he was made assistant general superintendent. Mr. Gaut has been general superintendent of the Waukegan plant since March, 1943.

* * *

MR. Dempsey was born in Stoneham, Mass., and is a graduate of Tufts College where he earned his B.S. degree in chemical engineering. His first position with this company was as a laboratory technician at Worcester where he began in May, 1917. Following a 15 month interruption due to military service, he returned to the Wire Company in February, 1919, and subsequently held a number of positions in the Cleveland and Pittsburgh districts before being named assistant to superintendent of North Works at Worcester. In February, 1944, Mr. Dempsey was transferred to Waukegan as assistant superintendent of the wire division, and seven months later he was named division superintendent, which position he has held to the present time.

BORN in Desmet, S. D., Mr. Strohm has worked for the Wire Company since November, 1923, when he started as a tractor helper in the Wire Mill at Waukegan. His entire career with the Wire Company has been in Waukegan where he has held a number of positions, the latest being department superintendent of the dry drawing department.

* * *

Herb Clough and Three Sales Associates Inducted Into Belden Twenty-five Year Club

FOUR members of the sales department of the **Belden Manufacturing Company**, Chicago, manufacturer of electrical wire and cable products, were recently inducted into the company's 25-Year Club. All received watches in commemoration of their quarter-century of service.

(ILLUSTRATED)
42" x 20" x 21" — (4000# cap.)

HEAVY DUTY

BREAK-DOWN REELS

1000#
2000#
4000#
} capacities

Rugged Design including patented DURA-CURL rim, and many other features necessary to provide the *Strength* and *Durability* needed for continued successful performance.

• • •

Also complete line of sizes of Modern High Speed Wire Drawing NO-CREV Spools and Reels for both fine and intermediate size wire.

MOSSBERG PRESSED STEEL CORP.

18 WEST STREET ATTLEBORO, MASSACHUSETTS, U.S.A. Telephone Attleboro 847 & 848

THEY are, **H. W. Clough,** Vice-President, who joined the company in April of 1922; **Shelton Wright,** industrial sales division, who joined a little more than a week after Clough; **Hoyne Howe,** also of industrial sales, who came with the company in May of 1922, and **Thomas P. Redmond,** in charge of sales estimating for the merchandise division, an employee since December of 1922.

* * *

Louis Allis Company Announces Changes

DUE to the expanding operations of **The Louis Allis Co., E. P. Allis,** President, announces the creation of three new offices. Elected to these new offices were **Louis Allis, Jr.,** Vice President in Charge of Sales; **Frank O. Kovich,** Vice-President in Charge of Manufacturing and **T. R. Wiesman,** Vice President in Charge of Engineering.

* * *

IN addition to the above elections, Mr. Allis appointed **C. O. Skidmore,** Sales Manager; **James H. Daganhardt,** Chief Engineer and **John J. Kirkish,** Chief of Electrical Design.

* * *

THE Louis Allis Co. is completing and moving into a large new factory building and office erected this year. Demand for its product is continuing at a very high rate and Mr. Allis stated that he expected the plant to operate at peak capacity in the foreseeable future. There are many new developments and designs on the drafting boards now and Mr. Allis stated that it was with a great deal of confidence he looked forward to The Louis Allis Co., one of the principal American manufacturers of industrial electric motors, continuing at a high level of employment and production.

* * *

Chain Belt Elects New Directors

L. **B. McKnight** and **O. W. Carpenter** were elected directors of **Chain Belt Company** at the annual stockholders meeting held at one of the Company's West Milwaukee plants in January.

* * *

MR. McKnight was recently elected a vice president of Chain Belt Company with executive responsibility for the two heavy machinery divisions of the Company.

* * *

MR. Carpenter was also recently elected a vice president of the Company in charge of finance.

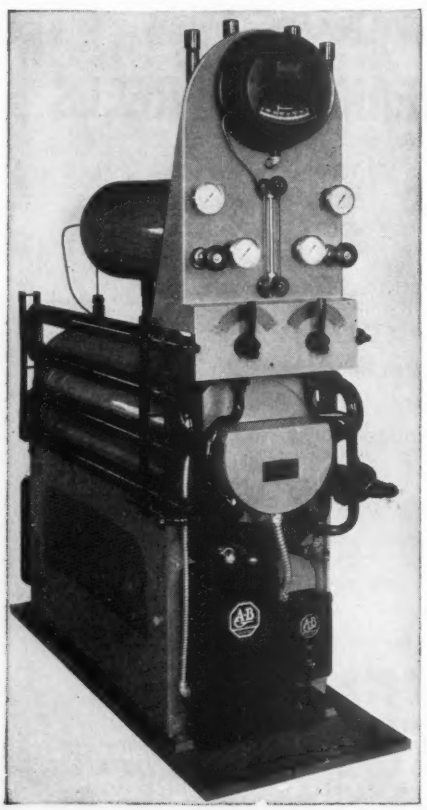
* * *

CHAIN Belt Company manufactures chains for conveying and power transmission; all types of conveyors and specialized process equipment; and construction machinery. It operates plants in Milwaukee and West Milwaukee, Wisconsin, and Springfield and Worcester, Massachusetts.

* * *

Hart Joins Watson-Standard Co.

JOHN J. Hart, Jr., has been named sales manager of a recently



THE ROYLE TEMPERATURE CONTROL UNIT

For Extrusion and Other Industrial Uses

A compact, simply operated unit designed to sustain any pre-determined temperature between 90°F and 475°F. — Hand-lever selection of desired temperature — Heat supplied — or drained — according to operational requirements — Formed piping, elimination of gaskets, and drip pans promote cleanliness — Breakdown of heat transfer oil reduced to a minimum — Three standard sizes 16KW, 32KW, 48KW — Other units with water circulation and refrigeration for operations requiring constantly maintained lower temperatures, 35°F to 200°F.

JOHN ROYLE & SONS ROYLE PATERSON N. J. 1880

PIONEER BUILDERS OF EXTRUSION MACHINES SINCE

London, England — James Day (Machinery) Ltd — REgent 2430
Home Office — E. B. Trout J. W. VanRiper — SHerwood 2-8262
Akron, Ohio — J. C. Clinefelter — JEfferson 3264
Los Angeles, Cal. — H. M. Royal, Inc. — LOgan 3261

PATERSON 3, NEW JERSEY

formed division of **The Watson-Standard Co.**, Pittsburgh, according to an announcement by Henry K. Watson II. This division will service a new line of safety finish products for industry.

* * *

MR. Hart comes to Watson-Standard from the Lake Erie Engineering Corporation, where he served as district sales representative and later as assistant manager of the firm's Feller Engineering Division. A graduate of Princeton University, Hart was associated with the Schloemann Engineering Corporation as sales engineer from 1940 to 1945.

Announcement of Reopening of Offices

DR. **Robert J. Anderson** has resumed his consulting engineering practice, specializing in the metallurgy of aluminum and magnesium. He may be reached at 125 N. Portage Path, Akron 3, Ohio, pending removal to a permanent location.

Promoted by Progressive Welder Company

APPOINTMENT of **Joseph R. Lex** as Assistant General Manager of **Progressive Welder Company**, 3050 E. Outer Drive, Detroit, has been announced by John D. Gordon, Vice-President and General Manager of the Company.

* * *

SINCE joining Progressive, Mr. Lex has been active successively in both sales and engineering of the company's line of resistance welding equipment.

* * *

Bee Chemical Company Elects M. A. Self to Vice Presidency

MR. **A. Self** was elected Vice President in charge of sales and a Director of the **Bee Chemical Company** at a joint meeting of the Stockholders and the Board of Directors recently. Mr. Self has been Sales Manager of the company since 1947 and in this capacity has been instrumental in promoting Logoquant, the new polystyrene treatment which is attaining national significance.

* * *

A graduate of the University of Kansas in Chemical Engineering, Mr. Self was formerly connected with Sharples Chemicals Inc. in sales development.

* * *

Bearings Company Elects New President

CHARLES P. **Collins** has been elected president and a director of **Norma-Hoffmann Bearings Corp.**, Stamford, Conn. He was formerly secretary and general counsel of SKF Industries, Philadelphia.

* * *

SEND IN

YOUR ORDER NOW

for the

1948 WIRE BUYERS GUIDE

THE WIRE ASSOCIATION takes pleasure in announcing

THE SAN FRANCISCO REGIONAL MEETING

ON JUNE 4, 1948, AT THE SIR FRANCIS DRAKE HOTEL.

The meeting will start with dinner at 6 P. M. and will feature two excellent papers of timely interest. Earl R. Potter of Industrial Wire Products, 2417 17th Street, San Francisco, Calif., will serve as chairman. The day of the meeting, there will be a Plant Inspection Trip to the wire mill of Columbia Steel Company. Those who plan to attend the meeting can go on this tour. Information can be secured from Mr. Potter.

Technical papers will be presented by Harold L. Trembicki of the Magnus Chemical Company, Garwood, N. J., which will cover the use of wire coating compounds, and by Herbert B. Clark, Vascaloy-Ramet Corp., North Chicago, Ill. His subject will be "Powder Metallurgy", a question on which all wire men should keep informed.

The N. A. M. will furnish a speaker on economic conditions and at the close of the meeting, an industrial motion picture, "Watts in Glass", will be shown through the courtesy of the Owens-Corning Fiberglas Corp., Toledo, Ohio.

ALL PACIFIC COAST WIRE MEN ARE URGED TO ATTEND

Write the Chairman or the Executive Secretary for reservation cards.

You will have a good and profitable time.

THE WIRE ASSOCIATION

RICHARD E. BROWN, Executive Secretary

300 MAIN STREET STAMFORD, CONN.

Tickets: $5.00 each.

J. M. Lambie becomes President of Jessop Steel Company

J. M. Lambie, president of Findlay Clay Products Company, Washington, Pa., has been elected president of **Jessop Steel Company,** Washington. He has been on the company's board of directors for ten years. Mr. Lambie succeeds Fred T. H. Youngman who resigned recently on account of ill health. E. M. Griffith who has been prominently identified with the steel industry has been elected executive vice president.

* * *

Timken Personnel Changes

OFFICIALS of The Timken Roller Bearing Company have announced five Bearing Division organizational changes as follows: **Blair Glenn,** general superintendent of the Canton Bearing Division, has been promoted to assistant factory manager of the division. **Henry Tobey,** canton bearing factory metallurgist, has been appointed general superintendent. **Fred Barnard,** assistant Canton bearing factory metallurgist has been appointed Canton bearing factory metallurgist. **Joseph Selby,** has been appointed assistant Canton bearing factory metallurgist. **Russell P. Fowler,** assistant general superintendent of the Columbus plant, has been appointed superintendent of the Bucyras bearing factory, where operations are scheduled to begin this Spring.

* * *

Dominion Steel & Coal Corp. Appointments

DOMINION Steel & Coal Corp. Ltd., Montreal, Canada, announces the appointment of **C. B. Lang** as president, succeeding **Arthur Cross,** who becomes chairman of the board.

* * *

R. E. Lewis Appointed Asst. District Mgr. of Oprs. for Youngstown Sheet & Tube Co.

ROBERT E. Lewis has been appointed assistant to the Youngstown district manager of operations, Youngstown Sheet & Tube Co. He succeeds **John H. Krehl,** who retired after 46 years of service.

* * *

Swan-Finch Oil Corporation Appointments

ERNEST V. Moncrieff, formerly president of the Swan-Finch Oil Corp., New York, has been elected chairman of the board of the company. **Howard F. Moncrieff,** formerly vice-president in charge of sales, has been elected president and chief executive officer. Both have been with Swan-Finch for over 30 years.

* * *

O. T. Englehart, President The Beryllium Corp.

OTTO T. Englehart, Washington attorney, has been elected president of the Beryllium Corp., Reading, Pa. He formerly had been a special assistant to the Attorney General.

* * *

The SPECIALISTS in Wire-Straightening and Wire-Cutting!

Diameter Range — 1/16" to .005"

PRECISION - Our Motto

DON'T hesitate to call on us when you are confronted with wire-straightening problems involving close tolerances and absolute accuracy. For seventeen years we have specialized in straightening and cutting all gauges of fine wire, hard or soft, ranging in diameter from one-sixteenth of an inch down to five-thousandths of an inch. We employ gun-barrel accuracy in straightening lengths from one inch to ten feet or any fractional part thereof. Ends cut absolutely clean without burrs.

ASK ABOUT OUR UNEXCELLED FACILITIES FOR CLEANING AND POINTING WIRE ALREADY STRAIGHTENED AND CUT.

ALL TYPES OF WIRE...

- Nickel
- Stainless Steel
- Bronze
- Brass
- Copper
- Alloy Wire
- Music Wire
- Tag Wire
- Florist Wire

Write us today!

Manufacturers of the famous ARMA PAPER CLIP

PITTSBURGH CUT WIRE COMPANY

1112-20 GALVESTON AVENUE · PITTSBURGH, PENNSYLVANIA.

TELEPHONE: CEdar 4702

Clark Moore Appointed Manager of Sales for Optimus Detergents

VAN Winkle Todd, President of **Optimus Detergents Company,** Matawan, N. J., has announced the appointment of **Clark Moore** as Manager of Sales.

* * *

MR. Moore brings to Optimus a wealth of experience in the sale of industrial products. Prior to joining Optimus, he was sales manager of the asphalt paving and industrial sales divisions of the Barber Asphalt Corp. During the war period, Mr. Moore was with the New York Office of the War Production Board as Chief Engineer. He later went with the Smaller War Plants Corporation as assistant Regional Deputy Director. Previous to his work with the Government, he had been President and General Manager of the Equitable Asphalt Maintenance Corp., of Kansas City, Missouri, manufacturers of highway equipment.

* * *

George Puchta Resigns After Fifty Years of Service in Wire Industry

GEORGE J. Puchta checked into work as general foreman of wire galvanizing at the **American Steel & Wire Company's** Cuyahoga Works for the last time at the end of February, 1948. When the new work week started on March 1st, he was absent from his job for the first time in over 52 years.

* * *

GEORGE retired after having spent his entire working life with American Steel & Wire. As a matter of fact, his service dates back to the period prior to the formation of the company and started when he was but 13 years old. Inasmuch as an average year includes 250 working days, it is estimated that Puchta had reported for work at this U. S. Steel subsidiary no less than 13,000 times.

* * *

IT was in February, 1896, that Puchta went to work for the Cleveland Rolling Mill Co., one of the predecessor companies of American Steel & Wire. His first job was winding pins and burlap. It wasn't long, however, before the lad began to make progress and by the time Cleveland Rolling Mill was taken over by the Wire Company he was a gauger in the fine wire department. He continued at the newly-named Newburgh Wire Works and served successively as a packer and a wire drawer before being named assistant foreman of the galvanizing and coarse bundling department in February, 1905. In 1912, he was promoted to the position of foreman of the galvanizing department and worked on that job until August, 1916, when he was transferred to Cuyahoga Works as galvanizing foreman. He has been general foreman of the wire galvanizing department since January, 1944.

* * *

ADVANTAGES WORTH CONSIDERING

When in the market for cable lacquers, insulating finishes, or impregnating compounds, consult us and have at your command:

1. SPECIALIZED RESEARCH EXPERIENCE
2. RECOGNIZED AND WELL EQUIPPED LABORATORIES
3. SUCCESSFUL PERFORMANCE RECORDS
4. CONFIDENTIAL TEAMWORK

and

5. 77 YEARS OF KNOWING HOW

Our Hot Melt, *Flame Resistant, Non-Toxic* Compounds are most widely used for AF and CF wires.
Your inquiry is invited.

STANDARD VARNISH WORKS

Engineers of Product Finishes

NEW YORK — LINDEN, N. J. — CHICAGO

Serving Industry For 77 Years

A Review of Recent Wire Patents

No. 2,435,191, RUBBER COATED STEEL OBJECT, patented February 3, 1948, by Orville E. Adler, Niles, Mich., assignor to National-Standard Company, a corporation of Michigan.

Steel wire is provided with an electrically-deposited coating of a rubber adherent alloy of 4% to 12% by weight of tungsten and a metal of either nickel, cobalt or iron, with a coating of rubber adherently vulcanized there on.

* * *

No. 2,435,239, PROCESS FOR REMOVING RESIN COATING FROM COPPER WIRE, patented February 3, 1948 by Robert Ira Schub, Chicago, Ill., assignor to Joe A. Stone, trustee.

For removing a polyvinyl formal resin coating from copper wire, the inventor treats the coated surface with formic acid until the resin has softened, and then separates the softened resin from the surface.

* * *

No. 2,435,266, APPARATUS FOR TESTING CABLES, patented February 3, 1948 by Samuel E. Brillhart, Lutherville, Md., assignor to Western Electric Company, Incorported, New York, N. Y., a corporation of New York.

The apparatus is said to be adapted for testing wire conductors, and includes a capstan for advancing a conductor, a second capstan over which is advanced a conductor from the first capstan, an electric motor tending to rotate the second capstan at a predetermined peripheral rate of speed, a torque motor for applying a torque to the first capstan, so that the conductor is tensioned, a controller for controlling the torque of the torque motor, a handwheel for operating the controller, a fixed scale, and a pointer secured to the handwheel for indicating on the scale the amount of tension placed upon the conductor.

* * *

No. 2,435,312, SOLVENT FOR DEGREASING IRON AND ALUMINUM, patented February 3, 1948 by Walter Klabunde, Niagara Falls, N. Y., assignor to E. I. du Pont de Nemours & Company, Wilmington, Del., a corporation of Delaware.

This solvent comprises trichlorethylene containing, as stabilizer against condensation reactions of trichlorethylene catalyzed by the metals, 0.02 to 1% by weight of diisobutylene.

Complete Description and Drawings of Patents May Be Had for 50 cents, outside the United States and Canada $1.00. Address, Wire & Wire Products, 300 Main St., Stamford, Conn.

No. 2,435,488, APPARATUS FOR POLISHING KNITTING NEEDLES AND THE LIKE, patented February 3, 1948 by Samuel Baylin, Montreal, Quebec, Canada.

The needles arranged in compartments slide longitudinally of the container as the latter reciprocates.

* * *

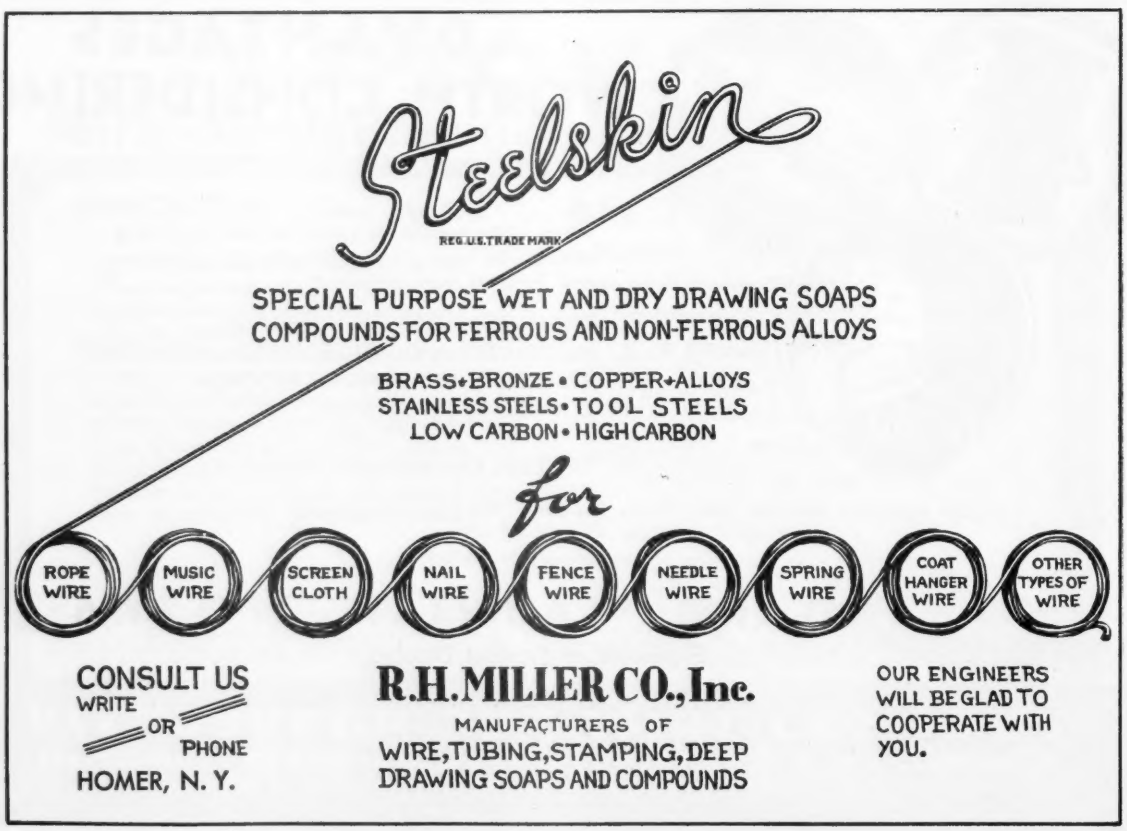
No. 2,435,567, METHOD AND APPARATUS FOR MOLDING WIRE CORE TEMPLES, patented February 10, 1948 by Michael Albanese, Rutherford, N. J., assignor to Columbia Protektosite Company, Inc., Carlstadt, N. J., a corporation of New Jersey.

This apparatus molds a plastic tube of substantially uniform diameter about a flexible central wire core. There are also method claims.

* * *

No. 2,435,657, INSPECTING WIRE DRAWING DIE, patented February 10, 1948 by Robert Henry Saviers, Morrisville, Pa., assignor to The American Steel and Wire Company of New Jersey, a corporation of New Jersey.

A method is patented of inspecting the die hole of a wire drawing die and providing plastic impressions.



No. 2,435,772, METHOD AND APPARATUS FOR TESTING WIRE, patented February 10, 1948 by Phillip C. Clarke, Line Lexington, Pa., assignor to Hunter Pressed Steel Company, Landsdale, Pa., a corporation of Pennsylvania.

The method of rotating beam fatigue testing wire is disclosed supporting at opposite points a loop of wire with the ends of the wire extending from the loop parallel to each other and of a form such that the distance between the points of support of the loop will equal

$$1.198 \frac{Ed}{s}$$

where E is Young's modulus, d is the diameter of the wire and s is a bending stress in excess of the endurance limit of the material of the wire under which the wire is to be tested and such that the height of the loop is equal to 0.835 times the distance between the points of support of the loop, and rotating the wire until it breaks.

* * *

No. 2,435,956, STREAMLINED CONDUCTOR CABLE, patented February 17, 1948 by Edward C. Craig, United States Navy.

This cable includes a conductor wire and a tow wire, with a thick, solid streamline-sectioned covering freely pivotal on the tow wire and the conductor wire, and tow wire parallel. The covering has an oversized bore for each of the wires, that for the tow wire being located ahead of the other with respect to the streamlined section so as to cause the covering to assume a streamlined position when the conductor wire is drawn through the air.

* * *

No. 2,436,110, ELECTRIC CABLE IMPREGNATED WITH TERTIARY ALKYL NAPHTHALENES, patented February 17, 1948 by Robert G. Larsen, Berkeley, Calif., assignor to Shell Development Company, San Francisco, Calif., a corporation of Delaware.

About the wire conductor is a wrapping of non-conducting porous material, this material being impregnated with a viscous non-oxidizing hydrocarbon oil dielectric consisting of tertiary alkyl naphthalenes having a boiling temperature above 190°C. at 3 mm. of mercury and a viscosity index below -100.

* * *

No. 2,436,772, SOLVENT FOR DEGREASING IRON AND ALUMINUM, patented February 24, 1948 by Walter Klabunde, Niagara Falls, N. Y., assignor to E. I. du Pont de Nemours & Company, Wilmington, Del., a corporation of Delaware.

This comprises trichlorethylene containing 0.02 to 1% by weight of an alkyl ester of a nitrogen acid selected from alkyl nitrates (containing 2 to 4 carbon atoms) and alkyl nitrites (containing 3 to 6 carbon atoms) the ester serving to inhibit the condensation reactions of trichlorethylene catalyzed by the metals.

British Empire Chamber of Commerce Issues News Bulletin

THE British Empire Chamber of Commerce in the U.S.A., with headquarters in New York, has initiated a new monthly News Bulletin to its members, according to Alexander Brackenridge, President of the Chamber. The new Bulletin contains trade opportunities for American and British concerns, briefs on import-export regulations, a monthly round-up of economic conditions abroad, late developments in specialized industries, newly available registers and reports of various trade missions.

* * *

THE Chamber's News Bulletin is to be made available for reference at the offices of World Trade Departments of Chambers of Commerce in the United States and the United Kingdom.

WEAN EQUIPMENT Corporation

THE WEAN EQUIPMENT CORPORATION are recognized as specialists in high-efficiency strip and wire mill equipment.

COLD ROLLING MACHINERY

For 36" Wide Material and Narrower

MILLS - REELS - SLITTERS - LEVELERS
COILERS - EDGERS - SCALE BREAKERS - SHEARS
SCRAP BALLERS - CONTINUOUS PICKLING

WIRE MILL EQUIPMENT

PATENTING, GALVANIZING AND TINNING TAKE-UP FRAMES
WIRE FLATTENING MILLS - SPOOLERS - NAIL GALVANIZING AND BLUEING EQUIPMENT - FIELD FENCE AND BARBED WIRE MACHINES

WEAN EQUIPMENT CORPORATION
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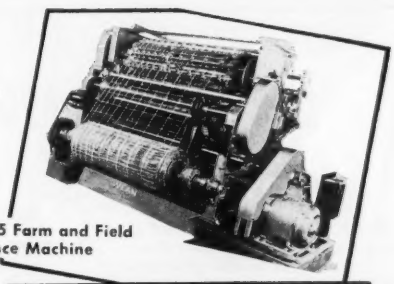
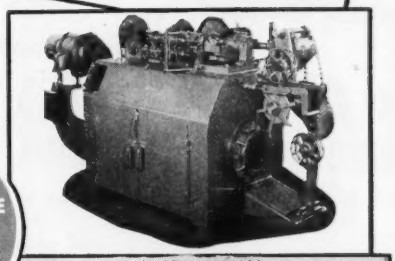
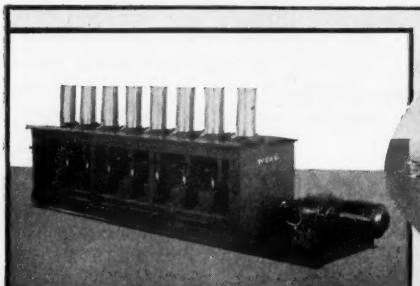
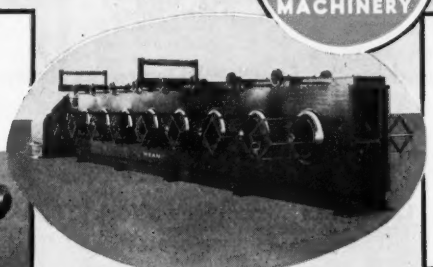
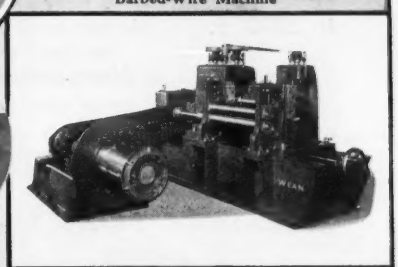

No. 1155 Farm and Field Fence Machine


Barbed-Wire Machine

HOLMQUIST BARBED WIRE and WIRE FENCE MACHINERY


8 Block Fine Wire Tinning Take-up Frame


16 Block Wire Galvanizing Take-Up Frame


Strip Reel and Slitting Unit

The Kintzing Wire Cloth Loom

FEW concerns in the United States can claim the distinction of having been in continuous operation for more than a century, to say nothing of remaining under the control and direction of one family.

* * *

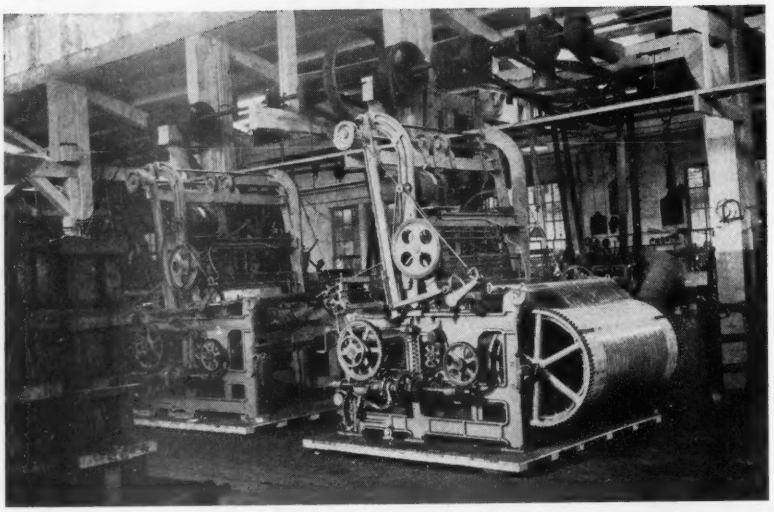
THE **Fitz Water Wheel Company** in Hanover, Pennsylvania, established in 1840 and, at present, managed by **John S. Fitz** of the third generation, can and does claim this rare distinction, now being in its 108th year of existence.

* * *

THE Kintzing wire cloth loom, which embodied the first positive shuttle motion and lathe frame, was invented and patented in 1890 by William F. Kintzing, who then began its manufacture for the American wire industry and after his death, his sons, J. Barnes and George Kintzing, carried on the business.

* * *

KINTZING Looms owe their wide acceptance in the wire weaving industry to their simplicity of design and convenience of operation, as well as to the fine grade of wire cloth that they produce. All of their basic principles have been retained by the present manufacturers, but improvements have been made in many details, such as in the machining of the frame and goosenecks, spreader rails, etc. All looms are now equipped with improved picker stands, new-style shuttle bar bearings, and chain-adjusters. All gears are machine cut today, warp drums or back beams are of steel, magnesium-alloy shut-



Kintzing Looms

* * * * *

Diamatrol

A high precision, **NON CONTACT,** continuously indicating electronic instrument for measuring the diameter of wire or cable. Special units are built for sounding alarms or lighting signals when tolerances are exceeded or for actuating servo systems to control machine adjustments.

An increasing number of wire mills are now using this equipment with extremely satisfactory results. Built in three standard sizes:

Model	
A	From .001" to .080"
B	" .050" to .300"
C	" .100" to 1.00"

Special units can be built to measure diameters over 1", as well as handle hot wire up to 2000° F.

Manufactured by the Standard Electronics Research Corp.

Address inquiries to:

HARRINGTON ENGINEERING COMPANY

405 Lexington Ave., New York 17, N. Y.

Murray Hill 6-9161

tles are furnished for weaving very fine wires.

* * *

REQUIRING added production facilities, a few years before his death in 1942, J. Barnes Kintzing arranged with the Fitz Water Wheel Company to transfer the loom manufacturing operations to their plant, where he continued to supervise their production. Two years later the Fitz Water Wheel Company acquired the rights and patterns and are now the sole manufacturers of Kintzing looms, which have been improved in many details, as experience and progress from time to time have made advisable.

* * *

HANOVER lies in the heart of the wire cloth sector of the United States. Approximately 75% of all the fly-screen cloth made in this country is processed within a radius of two hundred miles from Hanover, and this city is almost the only source of wire cloth machinery for the whole country, eliminating from consideration those wire weaving concerns who in the past, for lack of ability to buy all the equipment urgently needed, made some looms themselves.

* * *

WILLIAM F. Kintzing was at first an inventor, working for the A. B. Farquahar Company, predecessor of the present New York Wire Company of York, Pennsylvania. In 1890 he established his own machine shop in Glen Rock to manufacture the new loom that he had invented. Some time later the plant was moved to New Freedom, and later, in 1902, to Hanover. Here he became one of the organizers of the Hanover Wire Cloth Company, for whom his company built the looms. Other concerns in which he participated in organizing were the Keystone Wire Cloth Company, the Genco Light Company and a wire cloth concern in Norfolk, Virginia, for which last he took a contract for the erection and equipping of the entire plant.

* * *

LATER he formed a corporation known as the W. P. Kintzing Company and the excellence of his looms, having earned a fine reputation, resulted in his shipping them to all parts of the United States where wire cloth was made and, in addition, to Canada, South America, Australia, Russia and many other European countries.

* * *

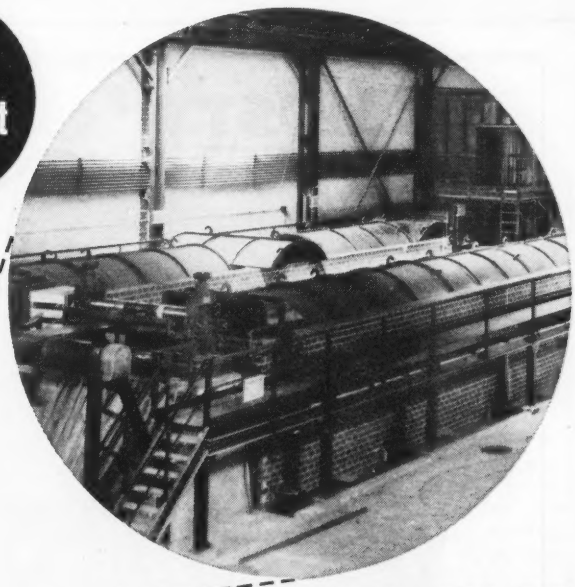
THE manufacture of Kintzing looms, in which the Fitz Water Wheel Company was well groomed before they acquired the business, is now an important division of a company whose heritage of doing things soundly and well equips them to add their traditions to those of the Kintzings in the service of the wire cloth fabricating industry.

Bulletin on Metal Slings

THE Cambridge Wire Cloth Company, Cambridge, Md., has issued a bulletin, No. 90, describing a new line of improved flexible metal slings useful in connection with the pickling, annealing and conveying of pipe, tubing, bars, etc. These are made in a variety of sizes and metals to meet different operating conditions. Copies of the bulletin are available on request.

* * *

In the Spotlight



In rapid, continuous strip pickling, "RODINE" not only saves acid and metal but also prevents over-pickling during line shutdowns.
Photograph courtesy Mesta Machine Co., Pittsburgh, Pa.

Rodine* IS A STELLAR PERFORMER IN PICKLING PLANTS THE WORLD AROUND

CHEMICALS ACP PROCESSES
RUST PROOFING AND PAINT BONDING
Granodine *
Duridine *
Alkodine *
Litholarm *
Thermoil-Granodine *
RUST REMOVING AND PREVENTING
Deoxidine *
Peraline *
PICKLING ACID INHIBITORS
Rodine *®

"RODINE"—the pioneer acid inhibitor—cuts production costs by reducing pickling costs.
"RODINE" in the pickling bath . . .
★ SAVES BOTH ACID AND METAL
★ PREVENTS OVER-PICKLING
★ INCREASES TONNAGE
★ GIVES BRIGHTER, MORE UNIFORM SURFACES
★ MINIMIZES ACID FUMES
Remember, it costs less to pickle with "RODINE" than without it.

Pioneering Research and Development Since 1914
AMERICAN CHEMICAL PAINT COMPANY
AMBLER, PENNA.
Manufacturers of Metallurgical, Agricultural and Pharmaceutical Chemicals

Issues New Catalog on Wire Forming Machines

A new 40 page catalog has been published by **O'Neil-Irwin Mfg. Company,** Lake City, Minneapolis, giving under one cover all of the "Di-Acro" dieless duplicating machines, shears and brakes made by them, including their recently developed new and larger models.

* * *

DESCRIPTIONS and illustrations not only show the machines and accessories, but space is devoted to showing how they work, with numerous examples of work that can be produced with the equipment.

* * *

A copy will be sent gratis to any reader desiring one.

* * *

1948 Annual Meeting of the American Society for Testing Materials

THE 1948 Annual Meeting of the American Society for Testing Materials, the 51st such session of this national technical organization, is to be held in Detroit the week beginning June 21. During this week there will be some 20 technical sessions, with a large number of technical papers and reports in the field of materials. There will be more than 300 meetings of the Society's technical committees, concentrating their work on standards and research in materials. Throughout the week of the meeting the Society's 8th Exhibit of Testing Apparatus and Related Equipment will be in progress.

* * *

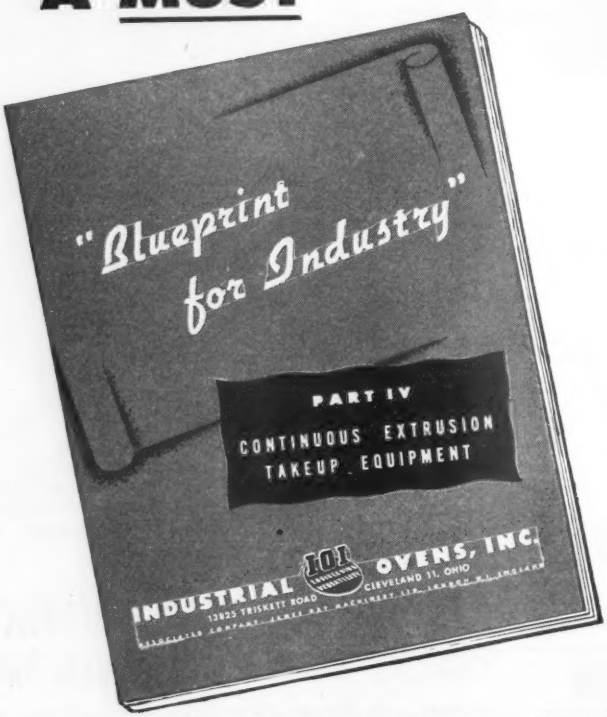
A feature of A.S.T.M. Annual Meetings since 1898 has been the presentation by leaders in their fields, of technical papers covering various aspects of the field of materials, particularly reporting new data on properties of materials and methods of evaluating them. At the 1948 Detroit meeting some 20 distinct sessions are anticipated beginning Tuesday morning June 22 and extending through Friday the 25th. Topics to be covered by the formal symposiums, or special sessions include the following: Symposium on Conditioning and Weathering; Creep, Stress Rupture and Short-Time High-Temperature Tension Testing; Round-Table Discussion on Spot Identification Test; Symposium on Mineral Aggregates, Symposium on Magnetic Testing, Symposium on Latest Methods of X-Ray and Gamma-Ray Inspection, and others. Several of the technical committees of the Society are sponsoring the symposiums.

* * *

G-E Control System on World's Fastest Cold-Strip Mill

AN electric "brain" and an X-ray measuring gage, both part of **General Electric** control equipment, are used on the control of the world's fastest cold-strip steel mill at the Aliquippa Works of the **Jones and Laughlin Steel Corporation** at Pittsburgh.

A MUST



. . . for Better Extrusion!

Heat at Work...in CONTINUOUS OPERATIONS

● Complete engineering data on IOI continuous extrusion take-up and accessory equipment is now ready, free for the asking. Industrial Oven's "Blueprint for Industry", Part IV, is a *must* for all who deal with extrusion of synthetic coated wires, cords, cables, tubing or monofilaments. Write for it today.

INDUSTRIAL IOI OVENS, INC.
13825 TRISKETT ROAD CLEVELAND 11, OHIO
ASSOCIATED COMPANY: JAMES DAY MACHINERY LTD., LONDON W. I. ENGLAND

THE mill was designed and built by the **Mesta Machine Company.** It features the heaviest construction of any tandem cold-strip mill for tin-plate gages in the world. The machinery weighs about 4000 tons and is anchored in steel-reinforced concrete foundations which go down to bedrock 50 feet below the ground.

* * *

GENERAL Electric engineers said that the new control system makes it possible to operate the mill at a speed of 70-miles-per-hour. Five-mile-long coils are rolled through the machines in less than five minutes. This is faster than any cold-strip mill has ever operated.

* * *

THE "brain" of the control system is the amplidyne, a small generator of unique design, which is used as an accurate measuring and control device. The amplidyne became famous during the war when used to control gunnery systems of B-29's and battleships.

* * *

IN the mill control system, the amplidyne is set to maintain proper speed relationship between the motors. When irregularities in operation occur, the amplidyne recognizes and immediately corrects them. The device also makes it possible for the mill to accelerate from a threading speed of 300 feet per minute to more than 4500 feet per minute in six seconds. It also permits the speed of the machinery to be reduced from 70 miles-per-hour to a standstill in six seconds.

* * *

THE other G-E feature is the X-ray thickness gage, which measures the thickness of the steel strip as it leaves the cold-strip mill. A radiation detector measures and compares the intensities of two X-ray beams, directed toward the strip and a standard sample, after they have been transmitted through their respective targets. If the intensities are the same, the rolled steel is of the desired thickness. If not, the steel is indicated to be either less or more than the desired thickness.

* * *

Catalog on Ball and Roller Bearings

A new catalog, No. 24, has been issued by the **Gwilliam Co.,** 360 Furman St., Brooklyn, 2, N. Y., covering their line of ball and roller thrust, step, journal, industrial and special bearings.

* * *

COPIES will be mailed to readers upon written request.

Two New Bulletins on Isothermal Heat Treatment and Cyclic Annealing Issued

A new bulletin entitled, "Ajax Isothermal Quench Furnaces" has been released by the **Ajax Electric Company,** Philadelphia 23, Pa.

* * *

IN this bulletin a new subject has been covered, namely, the combination of carburizing and isothermal treatment. The process is described and compared with other methods and the advantages pointed out.

What's your problem?

Fine Wire? Tungsten? Molybdenum?

Problem 1

Mr. Hi Hott needed molybdenum sheets for forming into parts. High hot strength and good ductility were required. North American Philips supplied him with Elmet Molybdenum sheets that met his specifications exactly.

Problem 2

Mr. N. O. Emission, II, required plated grid wires. He solved his problem with a call to Fine Wire Headquarters. We shipped him some gold plated tungsten and molybdenum wires. Result:• no secondary emission.

Problem 3

Mr. Insulate needed enamelled fine wire. So he ordered from Fine Wire Headquarters, and received fine enamelled copper wire made to his specifications.

the answer

Why not call Fine Wire Headquarters when you have a question about fine wire? We can't do the impossible, but we can do lots of things that can bring you the right fine wire for the job.

So—when you have a problem on Fine Wire, Tungsten or Molybdenum — wire, phone or write to North American Philips, makers of NORELCO Fine Wires, and ELMET Tungsten and Molybdenum products.

NORTH AMERICAN PHILIPS COMPANY, INC.

Dept. W-4, 100 East 42nd St., New York 17, N. Y.

THE second bulletin, "Cyclic Annealing" — No. 121 — covers the cyclic annealing of forgings, wire, rod, stampings and castings. Data on the process, equipment needed and the efficiencies resulting from the method are fully described.

* * *

THE Company will be pleased to send copies of these informative bulletins to those of our readers who may desire to have one or the other.

* * *

New Precision Tachometer

A new tool to measure speeds of rotation with extreme accuracy is now available for laboratory, test stand and general applications. The new Metron Precision Tachometer is accurate to ¼% of the speed being measured and is of the continuous indicating type, covering wide speed ranges.

* * *

TWO types are available, identical except for speed ranges: Type 48H, for speeds of 900 to 10,000 RPM; and Type 48J, for speeds of 90 to 1000 RPM. Each has ten overlapping ranges, selected by a rotary switch. No damage is incurred by accidental selection of the wrong range.

* * *

THESE Tachometers employ an electrical bridge circuit principle, and are self-calibrating. When calibrating, the sensitive speed measuring circuit is matched against internal precision resistors, thus insuring readings against changing ambient conditions.

* * *

THESE high-accuracy tachometers can be used with Metron Type 46 high and low-speed adapters to shift measuring ranges up or down from normal ranges. The tachometer head employs only one rotating part, permanently lubricated for long, trouble-free life. No vacuum tubes are employed, and all parts have essentially unlimited life.

* * *

New Wire Cloth Announced

THE **Michigan Wire Cloth Co.** announces that they are now in production on their new "Michigan Specification #4200". Specification #4200 was developed to replace 200 mesh wire cloth, which has been in short supply ever since European imports were cut off in 1941. It is said to be superior to 200 mesh in many respects, yet will sell for approximately one-third less.

* * *

THE manufacturers state that Specification #4200 is equal to 200 mesh in filtering and straining action, yet it is seven times as strong. The new material lasts considerably longer than 200 mesh, and it always lies flat. It is available in Monel metal and brass, and in other metals to special order. The new product was developed by Michigan Wire Cloth at a University of Michigan Research project.

New improvements in ...
Assure better performance from...
NOPCO WIRE DRAWING COMPOUNDS

LIKE ALL NOPCO* DEVELOPMENTS, NOPCO metal working products are subject to *continuing* improvement through *continuing* research.

NOPCO LABORATORIES, for example, are now conducting an extensive research program with the primary purpose of effecting several improvements in NOPCO's brass, copper and aluminum Wire Drawing Compounds. Among these improvements are:

1. **Changing the structure of the fats and oils in these compounds, thus enabling them to create a *stronger* bond between metal and lubricant.**
2. **Producing *more stable* fatty compounds.**

THESE SPECIAL RESEARCH PROJECTS do not *supplant* . . . rather they *supplement* NOPCO's regular activities in the production of metal working products.

NOPCO INVITES INQUIRIES from Wire Manufacturers regarding the possible application of these new, improved Wire Drawing Compounds to their products.

*Reg. U.S. Pat. Off.

NOPCO CHEMICAL COMPANY, Harrison, N. J.
FORMERLY NATIONAL OIL PRODUCTS COMPANY
BRANCHES: BOSTON • CHICAGO • CEDARTOWN, GA. • RICHMOND, CALIF.

NOPCO TRADEMARK EVOLVED THRU RESEARCH

SPECIFICATION sheets listing the physical characteristics of the new #4200 grade are available from the manufacturer, and samples in brass and Monel metal may be had upon request. Address inquiries to Michigan Wire Cloth Co., 2100 Howard St., Detroit 16, Mich.

* * *

G-E to Market Phenolic Liquid Resins and Varnishes

THE General Electric Chemical Department announced in February that it will start immediately to market four grades of G-E phenolic liquid resin and two grades of G-E phenolic varnishes. All grades are thermosetting plastics which condense on heating to form insoluble, infusible materials useful in a variety of laminating impregnating, and binding application.

* * *

GRADES Nos. 12300, 12302, 12303, and 12304 are phenolic liquid resins. They find wide use in electrical coil insulation and give excellent service in high temperature coil insulation in motor field coils, air blast transformer coils and heater coils. They are also recommended as binders or adhesives for glass wool insulation mats and for making panels from sawdust and wood chips.

* * *

G.E. stated that phenolic liquid resins Nos. 12300 and 12302 have high mechanical strength and excellent penetration properties. Grade No. 12300 is said to be highly soluble in water and to possess a high resin content. It was especially developed for the beater addition or machine impregnation of paper and can be mixed with almost 600 per cent water without the appearance of haze. Grade 12302 is recommended by G. E. for the production of odorless laminates such as refrigerator door liners, breaker strips, and milk processing equipment. It is acceptable wherever the finished part will be near food products.

* * *

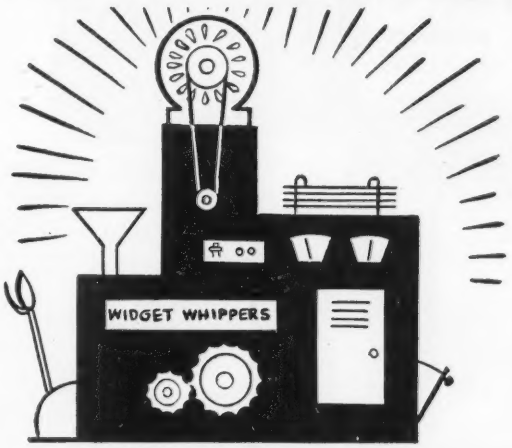
THE Company recommends that phenolic liquid resins Nos. 12303 and 12304 be used where superior surface hardness, high mechanical strength, and excellent electrical properties are desired. They are used extensively in laminated sheets and tubes where fast curing is required or in laminated phenolic bearings which require high mechanical strength and surface hardness. Grade No. 12304 having low viscosity and excellent electrical properties is widely used for transformer stationary coil insulation.

* * *

G.E. phenolic varnishes are available in Grades Nos. 12301 and 12305. G. E. recommends that they be used wherever a strong chemically resistant thermally insulating binder is required. Both 12301 and 12305 phenolic varnishes possess excellent electrical properties and high mechanical strength and are recommended for laminating sheets, tubes, and gears. While Grade 12301 is a general purpose laminating varnish used for high pressure work, 12305 can be used for either high or low pressure laminating.

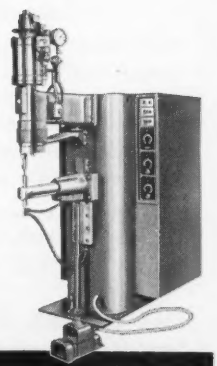
* * *

Whether you make Whippers



. . . or pots and pans, or trucks, or stoves, or any product fabricated of metal . . . you'll be interested in the story of Mr. Widget. He was faced with the dilemma of wanting to use resistance welding but not having sufficient plant transformer and distribution facilities to handle the extra load. Also the power people frowned on the addition of a *low power factor* load.

How Mr. Widget became a "Man of Success" with the aid of "THREE PHASE" is briefly told in the booklet; "How Mr. Widget Made More Whippers." Your copy is waiting—just drop us a post card. You'll find it well worth the 3 minutes reading time (not counting technical stuff.)



Manufacturers of a complete line of resistance welders. Offices in New York, Detroit and Dayton. Representatives in Principal Cities

SCIAKY

SCIAKY BROS. Inc., 4923 WEST 67th STREET, CHICAGO 38, ILL.

Steel Wire Tufts for Satin Finish Hanger Brushes

THE Hanson-Van Winkle-Munning Company, Matawan, New Jersey, announces an improvement in their satin finish hanger brushes. Each tuft will now be supplied with an S-hook, properly attached. These hooks provide the swing action required for a smooth satin finish.

* * *

TO keep the wire tuft in the most effective operating condition, occasionally reverse the brush on the spindle.

THE tufts for satin finish brushes are mounted on rods which are parallel to the axis of the hub. Formerly the user had first to open one end of the S-hook, slide it through the eye of the tuft, and then close the S-hook with a pair of pliers in order to be sure that there was a good tight connection between the S-hook and the tuft. This was a tedious chore; also it took the time of good operators who might have put it to good use doing satin finishing instead of assembling tufts and hooks, to replace the worn tufts on their satin finish brushes. Now that these brushes are supplied with the S-hook properly attached, this loss of time will be eliminated and production increased.

* * *

Anaconda Appoints Tri-State Supply West Coast Distributor

IT has just been announced that **Tri-State Supply Corporation,** 544 South San Pedro Street, Los Angeles, California has been appointed West Coast Distributor for Anaconda Magnet Wire, according to **A. H. Howard,** Tri-State Sales Manager.

* * *

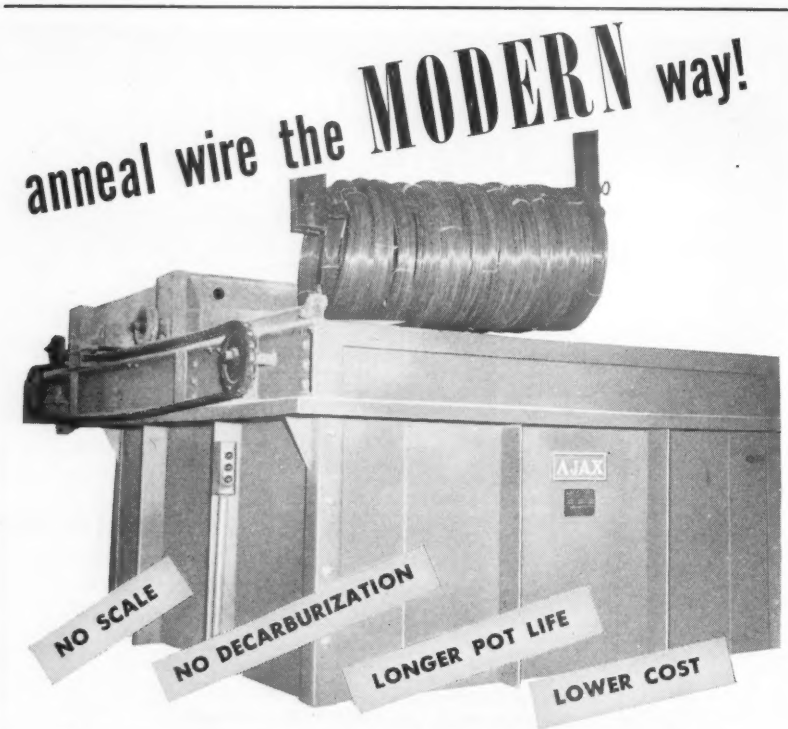
EFFECTIVE immediately, a complete line of Anaconda products for Western mine, industrial maintenance and motor repair will be available from all Tri-State warehouses located in Los Angeles, San Francisco and Seattle.

* * *

THE new appointment is a realization of Tri-State's desire to have available the best quality materials for western industry. Other manufacturers now represented by Tri-State Corporation include Bunting Brass-Bronze Co.; Cottrell Paper Company; Dielectric Products Co.; Dow-Corning Corp.; Elizabeth Webbing Mills; Continental Wire Corp.; P. D. George Co.; Hoover Ball Bearings; Ideal Industries, Inc.; Insulation Manufacturers Corp.; Kirkwood Commutator Co.; The Steelduct Co.; Mica Company of New York; Minnesota Mining & Mfg. Co.; New Jersey Wood Finishing Co.; Ohio Carbon Co.; Owens- Corning Fiberglas Corp.; and Taylor Fibre Co.

* * *

ADVERTISING is a service to a magazine's readers. Methods, materials, and machinery were developed under the stress of war. Both editorial matter and advertisements keep you informed on what is happening in industry.



You'll save money, you'll improve efficiency along many lines with the unique Ajax Electric Salt Bath wire annealing method. It requires less floor space, less labor, less maintenance. Heating cycles average less than 20 minutes, even on difficult jobs. There is no scaling, no decarburization, no explosion hazard, none of the bothersome problems entailed with atmosphere equipment. Salt bath treating does the work faster, better, cheaper!

Ideal for annealing low- or high-carbon and stainless steel wire and rod; annealing aluminum, and copper and silver alloys; and for descaling stainless and alloy steel wire in molten salt baths.

AJAX ELECTRIC COMPANY, INC.
Frankford and Delaware Aves. · Phila. 23, Pa.
The World's Largest Manufacturer of Electric Heat Treating Furnaces Exclusively

AJAX HULTGREN ELECTRIC SALT BATH FURNACE

WRITE FOR YOUR COPY!
This 72-page Ajax booklet tells the entire story of salt bath heat treatment as applied throughout modern industry. Ask for Booklet 116.

New Bulletin on Rodine

THE American Chemical Paint Company, Ambler, Pa., has published a new Technical Service Data Sheet, No. 13-1, giving complete information on Rodine, a pickling inhibitor, or control chemical to retard acid attack on steel.

* * *

THE question of what it is, what it accomplishes, how it should be used, why it should be used and the grades in which it is furnished are all answered in readily accessible form to provide users and prospective users with information they require for their pickling operations. Please write direct to A.C.P. for your copy.

* * *

Multiple Channel Photoelectric Counting System Counts with 10 "eyes" at the Same Time

TO provide a means of counting small parts at high speed for packaging and inventory, the **Potter Instrument Company** announces the development of a radically new count detection system. The system employs ten separate photoelectric detectors operating in parallel and connected to one of the Potter High Speed Electronic Counters. The circuits are designed to resolve simultaneous or random counts in ten channels. The equipment can be used to replace the inaccurate ratio-weighing scale systems and will provide high speed predetermined counts of absolute accuracy.

* * *

THE electronic counter will register the count of each part even though ten parts fall past the ten photoelectric detectors at the same instant. With this system, a count of absolute accuracy can be either totalized or predetermined. Heretofore in the photoelectric counting of parts, elaborate feeding mechanisms consisting of shake tables or conveyor belts divided into channels can be used to feed at low speed while the counting is accomplished at high rates. For instance, if each channel feeds at a rate of 10 parts per second, the counting rate for the ten channels would be 100 per second. In any event, since the counting system is completely electronic, any desired counting rate can be supplied. The photoelectric detectors will respond to changes in light level as small as 20%. Therefore, complete interruption by the objects being counted is not required.

* * *

IN addition to the counting of objects, the same system can be applied to totalizing and predetermining machine operations through the use of other systems of detection.

* * *

THE Company will be happy to appraise all counting problems without charge. For additional information write to the

Potter Instrument Company, Inc.
136-56 Roosevelt Avenue,
Flushing, New York.

* * *

NOTICE TO SUBSCRIBERS

the 1948

WIRE & WIRE PRODUCTS BUYERS GUIDE
and Year-Book of the Wire Association

is now ready

The 1948 Edition of this useful directory may be obtained by subscribers at 40% discount from the list price of $5.00 per copy. So when ordering your subscription to WIRE and WIRE PRODUCTS, if you want a copy of the BUYERS GUIDE, please enclose $3.00, or send the order and ask us to bill you.

Members of the WIRE ASSOCIATION will continue to receive a copy of the BUYERS GUIDE as part of the service extended to them, and the cost is included in the dues.

To all others the price remains as heretofore

$5.00 per copy.

THE BUYERS GUIDE is a complete directory of all kinds of wire and wire products manufactured in the country, together with listings of all machinery, equipment, supplies and services used by the Wire Industry.

It is an invaluable source of information on everything of interest to wire men. Be sure to order your copy early to be certain of getting one, as the edition is limited. Published in Spring annually . . . Only $3.00 to subscribers.

WIRE & WIRE PRODUCTS

300 MAIN STREET STAMFORD, CONN.

MUSIC WIRE
071
REGULAR
45
Alarm clock, electric razor, telephone, automobile, typewriter, calculator, switches and electric motors, pruning shears, push button radio controls and . . . yes, the juke box—the list goes on and on . . . all function because of dependable wire springs—JOHNSON XLO Music Spring Wire, the wire of a thousand uses, made under strict laboratory control all the way from mine to you.
JOHNSON
STEEL AND WIRE COMPANY, INC.
WORCESTER 1, MASS.
New York Philadelphia Cleveland Detroit Akron Chicago
Atlanta Houston Tulsa Los Angeles Toronto

Corrosion Authorities Receive N.A.C.E. Awards

Dr. Ulick R. Evans and Dr. John M. Pearson Honored by National Association of Corrosion Engineers

TWO eminent research authorities, **Dr. Ulick R. Evans** and **Dr. John M. Pearson**, have been named recipients of the 1948 awards of the National Association of Corrosion Engineers, it was announced by G. R. Olson, President of the Association. Dr. Evans has been honored with the Willis Rodney Whitney Award in Corrosion Science and Dr. Pearson with the Frank Newman Speller Award in Corrosion Engineering. These awards are made annually by the N.A.C.E. in recognition of outstanding contributions in science and engineering as pertaining to the field of corrosion. Presentation of the awards will be made at the Association's Annual Banquet to be held April 7, at the Hotel Jefferson, St. Louis, Mo.

* * *

Fumes

(*Continued from page* 318)

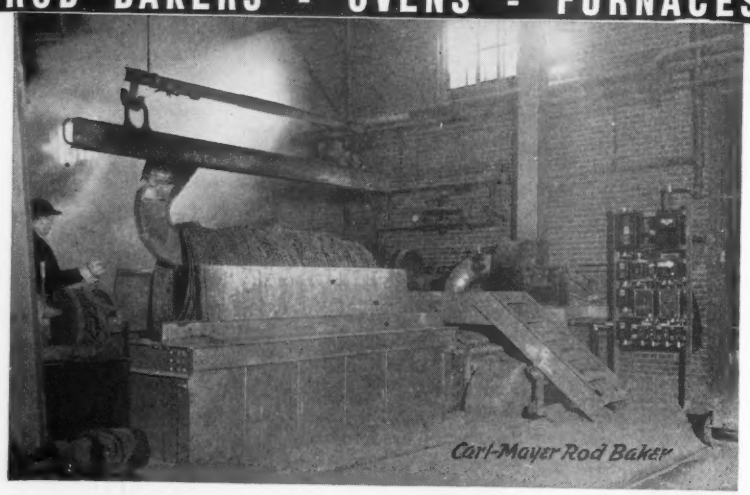
galvanized, but may be defective because a leak has developed at the seam, etc. In one plant where water tank heaters were repaired the area to be repaired was first swabbed good with muriatic acid to remove the zinc in the area to be welded. The weld was made on iron stripped of its coating. If this precaution is not taken, heavy zinc oxide fumes will be present from zinc burned off during the welding, and in addition such a weld may be a very poor weld. Iron to iron makes a good weld; any zinc in the weld tends to ruin it.

* * *

Flame Shrinking Galvanized Plates

DURING the war in the shipbuilding industry the fume problem became a very serious one in a number of plants where flame shrinking was done on galvanized plates. A technique without generating obnoxious fumes is described in STEEL, page 108, April 19, 1943. The article was written by **Al Lake**, Albine Engine & Machine Works, Inc. He states —

MORE PRODUCTION
with CARL-MAYER HI-SPEED
ROD BAKERS - OVENS - FURNACES



TYPICAL HI-SPEED ROD BAKER — DIRECT OR INDIRECT HEAT — ANY FUEL
Patented
WRITE for BULLETIN No. 241
Growing interest in our type of equipment is evidenced by Carl-Mayer installations for such plants as:—
American Steel & Wire Co.
Atlantic Wire Co.
Atlas Steel Co.
Atlas Tack Corp.
California Wire Cloth Corp.
Eaton Mfg. Co.
Frost Steel & Wire Co. Ltd.
Hollup Corp.
Johnson & Nephew Ltd.
Jones & Laughlin Steel Corp.
Pittsburgh Tool Steel Wire Co.
Republic Steel Corp.
Steel Co. of Canada
Wickwire Spencer Steel Div.
Page Steel & Wire Co.
THE CARL-MAYER CORPORATION
3030 EUCLID AVENUE
CLEVELAND, OHIO

"That FUME SICKNESS is a real problem is evident from the fact that in some war industries it takes a toll of 40 per cent of the man-hours of those shrinking galvanized metal."

* * *

THE method of practically eliminating zinc fumes in this kind of work is described in this article.

* * *

Other Industries and Industrial Processes

BRIEF mention of some fume references outside the galvanizing industry are included at this time because they are available, and can be consulted at length for anyone specifically interested in that particular type of fume.

* * *

Zinc Oxide Fumes

UNDER the title of "ZINC OXIDE FUMES" **The Metal Industry,** August 1937, page 405 discusses zinc oxide fumes developed in pouring brass. Another reference to the effect of Zinc Oxide Fumes is found on page 547, the **Metal Industry,** November 1937 in the Editorial Comment. Pictures of a Zinc Fume Recovery System are given in the **Metal Industry,** June 1933, page 201.

* * *

Welding Fumes

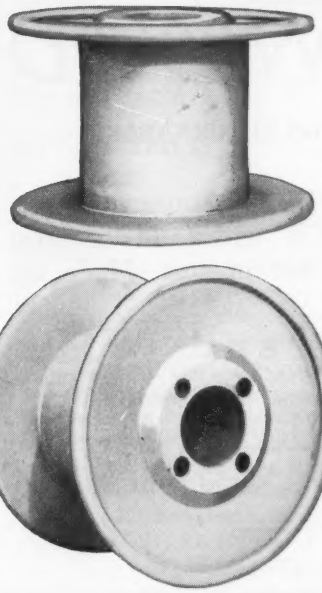
STEEL, September 13, 1943, page 116 carries an item, "Welding Fluid Reduces Effects of Fumes". A material produced by the Midland Paint & Varnish Co., Cleveland, Ohio, is claimed to reduce welding fumes and zinc fumes by 30 per cent. It is used to keep down the zinc fumes when welding galvanized iron.

* * *

Degreaser Fumes

UNDER the title of "MYSTERY DEATHS BY FUMES SOLVED", an item in a Philadelphia Newspaper discusses deaths that resulted from trichlorethylene and carbon tetrachloride used in industrial degreasing machines. The time of printing the item was evidently in 1943 as no exact date or name on the paper could be identified. The information is taken from a clipping. Findings reported by **Dr. Arthur J. Geiger** of Yale

FOR HIGHEST SPEEDS



APCO MOSSBERG

PRECISION

STEEL REELS

The reels that are engineered to the job... designed and built by the company that originated the steel reel idea . . . are the reels you should be using in your plant. Every year, more and more Apco Mossberg Steel Reels are bought by quality-minded buyers throughout the wire industry.

FREE

ENGINEERING SERVICE

Without obligation to you, Apco Mossberg engineers will be glad to study your reel problem, and supply complete suggestions, drawings, blue prints. Write for information today. *Canadian Representatives:* Hugh Williams & Company, 47 Colborne St., Toronto, Ontario.

REELS . . . SPOOLS . . . BOBBINS

APCO MOSSBERG COMPANY

(THE ORIGINAL FRANK MOSSBERG CO.)

21 LAMB ST., . . . ATTLEBORO, MASS.

WILLEY'S SIZING EXTRUSION

and

WIRE DRAWING DIES

They are made from a specially developed grade of Tungsten Carbide having those characteristics needed for dies—freedom from porosity, great abrasion resistance and the ability to take a polish equal to that of diamonds.

FOUR CLASSIFICATIONS OF WILLEY'S DIES

A. Blank and rough cored nibs.
B. Rough cored dies (cased).
C. Semi-finished, rough drilled dies (cased).
D. Finished dies, ready for use.

Sales Engineers in Principal Cities.

Standard Sizes from .325 to 4.000. Special Sizes and Shapes Made to Order.

WRITE FOR NEW CATALOG 30 Gives full information on Willey's Dies in addition to other standard tools.

WILLEY'S CARBIDE TOOL CO.

SOLE MAKERS OF WILLEY'S METAL

1342 W. Vernor Highway Detroit 1, Michigan

REELS OF WOOD

RETURNABLE and NON-RETURNABLE

Furnished assembled or knocked down, made to your specifications. Will withstand severest handling. Sturdy, strong, low in cost. Made for

CABLE, ROPE and WIRE

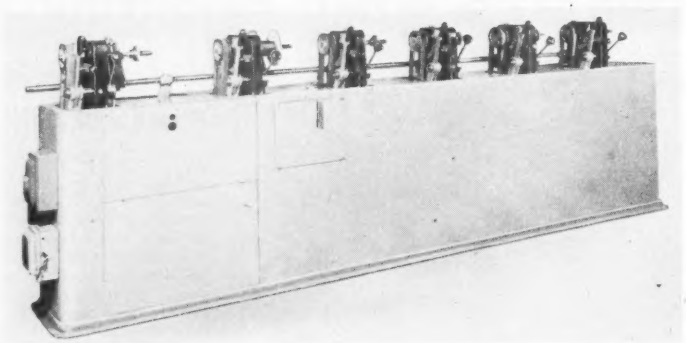
in any size from 12" to 96" in diameter.

ALSO, REEL HEADS FOR STEEL DRUMS

Send us your specifications and let us quote on costs.

BRIDGE MFG. CO., Inc.

HAZARDVILLE • CONNECTICUT



NO. 1900K MULTIPLE SPINDLE SPOOLER

This spooler is outstanding for its many unusual and desirable features. Takes spools up to 16" flange diameter. Enclosed type, with mechanism readily accessible from rear side. Spindles mounted on ball bearings and each may be stopped or started individually. Uses Worthington All-Speed Drive unit.

All Emory Spoolers supplied standard or equipped to meet customers' special specifications.

On Spooling problems, consult

ROBERT J. EMORY COMPANY

31 EAST RUNYON STREET NEWARK 5, NEW JERSEY

University Medical School, to the Journal of the American Medical Association.

* * *

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1938 December	Holden, Ph.D., E.R. Pittsburgh Plate Glass Co., Fume Protection. Hazards and Safety, page 27.
1938 December	Hazards and Safety, page 32. Cancer from Sulphuric Acid Mist; Ignorance of Hazard No Excuse.
1943 April 19,	Lake, Al. Flame Shrinking Galvanized Plates, Without Generating Obnoxious Fumes. STEEL, April 19, 1943, page 108.
1937 August	Metal Industry. Zinc Oxide Fumes, page 405.
1937 November	Stone, R.H. Melting Equipment in the Non-Ferrous Industry. Metal Industry, June 1933, page 201, Fig. 4.
1943 September 13,	STEEL, Welding Fluid Reduces Effects of Fumes. September 13, 1943, page 116.
1943	Philadelphia Newspaper — "Mystery Deaths by Fumes Solved." Clipping — no date or paper.

* * *

Part II will be published in the May, 1948 issue of WIRE & WIRE PRODUCTS

* * *

Newpher Becomes Production Manager for Reliance

C. Richard Newpher, Production Manager of the Ivanhoe Division of **The Reliance Electric and Engineering Company** for the past two years, has been made Division Manager as well, it was announced today by Fred. E. Harrell, Manufacturing Vice President of the company.

* * *

IN his enlarged responsibilities, Newpher will also have charge of the plant at 1170 Ivanhoe Road, purchased by Reliance in January from the Detroit Steel Corp.

* * *

A Clevelander by birth, Newpher has been with Reliance since his graduation in Mechanical Engineering from Case Institute of Technology in 1937.

* * *

New, Handy Packaging for Ersin Multicore Solder

FOR the first time, 3-cored Ersin Multicore Solder is available in two small, handy packages suitable for over-the-counter selling. These additions to the Ersin Multicore line are presented by **British Industries Corp.**, 315 Broadway, New York, U.S.A. and Canadian distributors. They fill a growing demand for small, convenient counter packages, clearly marked as to size and alloy.

* * *

THE NEW 1 LB. PACKAGE features a novel pull-as-required arrangement which adds speed and convenience, and eliminates wastefulness in use. This is a particularly desirable feature in quick-acting Ersin Multicore, the only solder made with extra active non-corrosive Ersin Flux.

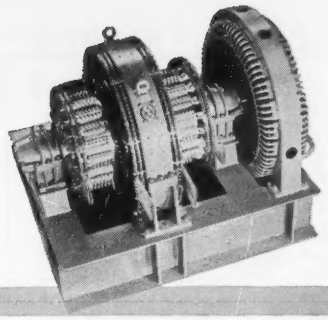
* * *

Corronizing Processes

(*Continued from page* 311)

that on the outside of the coating it reacts very similar to a zinc coating as far as galvanic protection is concerned. It is also to be noted that each succeeding alloy layer is in a sense protected by the preceding alloy layer which is sacrificial to it and thus progressive protection of the base metal is obtained. This progressive protection is very important because as Corrosion progresses the particle sizes and by-products of corrosion are different in each succeeding alloy. Although it is possible to obtain all of these alloys by the heat treatment of the nickel and zinc plated coatings it is more desirable to control the alloying reaction so that all the free zinc and the delta alloy is converted into a gamma alloy. This particular gamma alloy exhibits the corrosion resistance which

H-VW-M
GENERATORS
FEATURING
Versatility



FEATURES built into H-VW-M generators qualify them for many types of service, appeal alike to electroplaters, anodizers, electrotypers, producers of electrolytic chemicals, metal refiners. Among these features are:

Core-ventilated laminated armatures of non-aging silicon steel • Low-loss laminated fields • Generous sleeve-type bearings with oil-rings — for long, quiet operation, easy maintenance • Wide voltage range or stable voltage characteristics, as needs require.

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H-VW-M generators are built in standard voltage ratings of 6, 9, 12, 15, 18, 25, 30, 40, 50; in ratings up to 25,000 amperes.

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Manufacturers of a complete line of electroplating and polishing equipment and supplies
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fine, treated yarns wound 4 ends parallel for high-speed wrapping by new Abbo-sealed process will be available soon.

waxed cable-filler for 2- and 3-wire semi-metallic sheath cable and ship-board cable.

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ROOS MACHINES for the DIE ROOM

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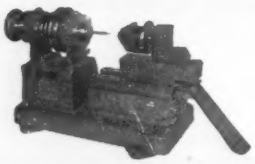
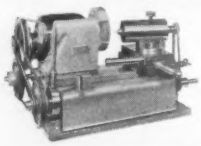
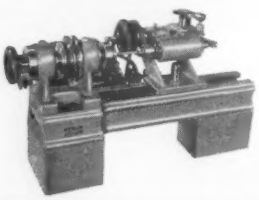


- **ROOS PRECISION PIN GRINDER**



- **ROOS AUTOMATIC POLISHERS**



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has been sought so many times by other plated coatings. Along with the formation of the gamma alloy is the beta alloy which exhibits outstanding characteristics in the resistance to corrosion of dilute acids and condensates.

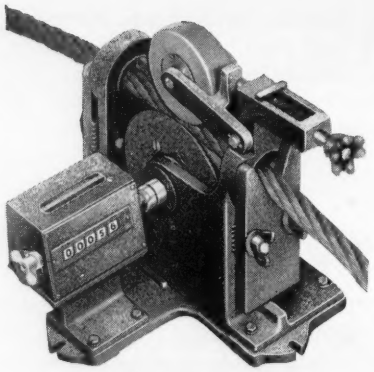
* * *

IN addition to the corrosion resistance properties of the nickel zinc Corronized coatings, they are smooth, ductile, resistant to abrasion, dark in color and are an excellent base for paints, or other finishes without subsequent treatment. The ductility of the Corronized coating offers material which can be sheared, blanked, drawn, pierced or formed. Finished article can be seam, spot, arc or gas welded as well as seam locked. Nickel zinc Corronized wire can be twisted, bent, formed as is necessary in wire products without breaking or cracking of the coating, provided ductility of the base metal is sufficient to perform these operations. The many requirements of wire and wire products in which articles need to be welded into assemblies of the parts formed in such a manner as to require ductile and good adhering coatings recommends the use of the nickel zinc coatings for these types of operations. The coating thicknesses of the nickel zinc Corronizing processes are of course very thin. An example of a coating which will give an excellent account of itself corrosion-wise consists of a deposit of nickel .0002" and zinc .0002" heat at 700° F. for 20 minutes in an air type furnace. Thus it can be seen that such coatings require a minimum of metal and do not change the shape or size of the ultimate part.

* * *

The Nickel Tin Process

THE **nickel tin** Corronizing process consists of depositing nickel on steel and the depositing of tin on the nickel. The article is then heated at low temperatures of 350° F. for times ranging from 5 minutes to one hour, depending on the type of article and the coating thickness. Upon heat treatment of the nickel tin coatings various alloys are formed with a layer of free tin remaining on the surface. By vary-



Model L-20—double worm drive for smooth, continuous operation—subtracts when reversed.

Mile-a-Minute COUNTING

The Productimeter illustrated above will measure wire up to 1½" diameter at speeds of 5000 feet per minute — nearly a mile a minute. Exclusive features assure accuracy and long life for these precision instruments. Speed and assured accuracy are absolutely necessary to prevent losses in wire manufacturing or handling. Also models available to measure wire down to .010 in.

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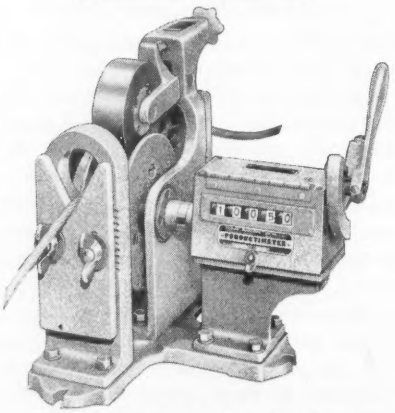


Model L-R-20-Q. Predetermined Productimeter provides signal at end of pre-set run. Cycle repeated after re-setting. Speed — 2000 feet per minute.

PRODUCTIMETERS SINCE 1879 — Speedometers OF INDUSTRY

ing the heat treatment temperatures the luster of the nickel tin coatings can be made with a matte finish or a bright finish.

* * *

THE nickel tin Corronizing process provides a material which is ductile and when used on suitable steel can be sheared, formed, drawn, bent or welded. In this manner blanks can be processed and then formed to shape giving uniform coating thickness. The use of the nickel tin coatings for food preservation applications is excellent. It provides maximum protection with minimum coating thickness and, therefore, gives minimum material cost. Nickel tin Corronized wire has many applications in refrigerators and kitchen equipment. An example of a good average nickel tin coating would be a deposit of nickel .0001" and a tin coating of .0001" heated for 45 minutes at 350° F.

* * *

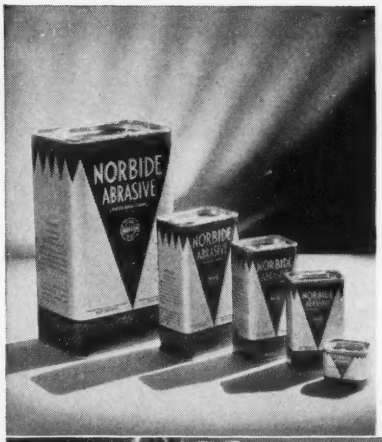
TO sum up the processes it can be said that where quality protection is required the nickel zinc and nickel tin coatings are to be recommended. Nickel plating should be done in an ordinary Watt's type bath without brighteners. Zinc plating can be accomplished in either an alkaline or acid type bath and the tin plating in the alkaline stannate baths. For best results it is recommended that brighteners and addition agents be left out of all these baths. Heating can be accomplished in ordinary ovens, salt baths, oil baths, induction or radiant burners. The latter type of heating provides a really economical method and is economical from the installation and maintenance standpoint.

* * *

Cleaning

THE usual cleaning method or procedure should be adhered to as far as metal preparation of the parts is concerned. Due to the fact that heat treatment provides such a great increase in corrosion resistance of the coating it also gives the advantage of hydrogen embrittlement relief which is so essential to corrosion functions.

* * *



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NORBIDE Abrasive is successfully used for cutting and semi-finishing cemented carbide wire drawing dies. This abrasive is second only to diamond powder in hardness and is 150 times less expensive. Sizes 220 and 240 for ripping; 320F for semi-polishing; 500 to 800 for final finishing.

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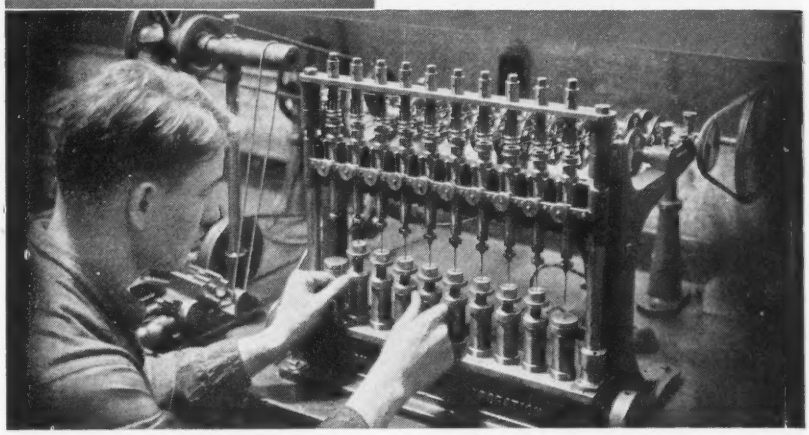

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No surface decarburization or scale.
Faster wire speeds . . . greater production.
Equipment fully automatic and easy to operate.
Control of heating and cooling cycles extremely accurate.
Thermal efficiency of the process very high.
Much finer grained structure possible.
High quenching temperatures rapidly attained.
Adaptable to high alloy and austenitic steel wire and strip (annealing of stainless).

The Trauwood Process, new in principle, eliminates high temperature furnaces and lead pots with their excessive maintenance costs and low thermal efficiencies. More positive temperature control is possible and quenching is done in a RISING temperature—instead of falling, as in conventional heat treating methods. The rapid rate of heating (4 to 5 times as fast as furnace heating) increases production and uniformly produces a finer grained product with higher physical and fatigue values.

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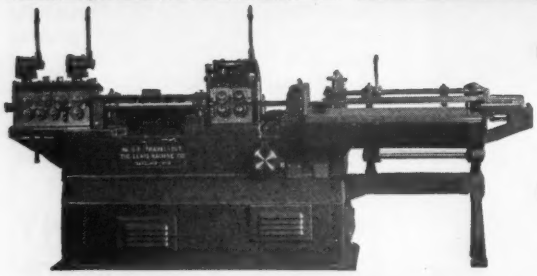

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PRODUCERS OF Manufacturer's Wire in many sizes, shapes, tempers and finishes, including Galvanized, ROEBOTE, Flame-Sealed, Copperoid, Tinned, Annealed, Liquor Finished, Bright, Lead Coated, and special wire. ACIO, Coated and Uncoated Steel Sheets, Nails, Continental Chain Link Fence, and other products.

The Administration of Inspection and Despatch in a Steel Wire Mill

(*Continued from page* 310)

during its passage through the Works, these band wires being of a loose and temporary nature, and not firm enough to withstand the rigours of transport. Therefore, a primary job in the bundling of every coil is to remove the temporary fastenings and bind the coil firmly with strong binding wires which will withstand any rough treatment the material may receive in transit.

* * *

AFTER binding, the material is next suitably protected according to its quality and the customers requirements. BRIGHT STEEL ROPE WIRE which is a large portion of our output is liable to rust if left for any time in contact with the atmosphere. It could be protected by wrapping with waterproof paper, but this would, of course, involve the customer in unwrapping the material on receipt. During and after the fabricating of wire into ropes, the Rope Manufacturers invariably lubricate and protect the material by the use of oils and greases and consequently it is not detrimental to their processes if the material is despatched by us with a protective film of grease on the surface. It is standard practice, therefore, after weighing and bundling to immerse the material in a tank of hot grease. The grease used is one which is solid at normal temperatures. The wire is dipped in the tank for a short period which allows it to become warm, thus, on removal from the tank the heat which has been absorbed by the wire causes the bulk of the grease to drain off and finally there is left on the wire a film of grease which, when cooled and set, will not drain off at normal temperatures.

* * *

THE packing of wires, which by reason of their later application cannot be immersed in grease, but which require to be protected from the atmosphere, involves a protective covering of paper of canvas etc., of which there are many quali-

ties. In the selection of a wrapping paper one which has been creped is preferable as this enables the paper to be knit closely to the coil and so excludes moisture or air.

* * *

THE exclusion of moisture or air is of paramount importance with such qualities as Heald and Card wire, and in the packing of these types of wire two types of paper are used. The first wrap is one of paper which is oil proof and waterproof. This class of paper, or cellulose film as it is really, has no sealing properties. The second wrap used consists of wax impregnated creped paper, which has high sealing properties and great mouldability. An important point in the selection of packing materials is that they must be chemically neutral, and have no acid content which would cause rusting in the case of bright steel wire, and damage to the zinc coat in the case of galvanized wire. This point is also important in the selection of oils and greases applied in certain cases for the protection of the wire.

* * *

Labelling

THE labelling of coils is important because, as you know, a large proportion of our output is despatched in individual coils and is not enclosed in barrels or cases. It is impracticable to send every order separately as the tendency is for transport firms to require loads larger than our average orders. Therefore, a single consignment to a customer may consist of several items or batches of wire against different orders. As each batch will contain a number of individual coils, you will appreciate that it is essential that every coil should bear identifying marks to enable its characteristics of size, quality, order number, etc. to be easily noted.

* * *

Weighing

SINCE the weight produced by the Warehouse is a Selling Weight its accuracy is very important both from the Customers' point of view as well as the Company's. As is required by Law, all the weighing machines are checked at regular

USE THE PROVEN BRAND . . .

Whatever wire product you make, Cortland Brand wire can help you make it better. For wire fabrication of all types, Cortland wire has the right softness or hardness, freedom from surface defects, and correct lubricating properties. There is a Cortland wire in a size and style to fit your requirements.

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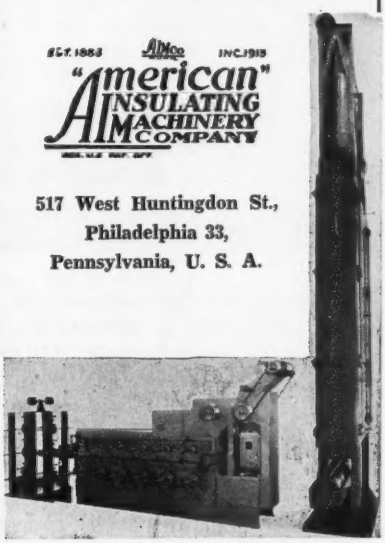

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For drawing both ferrous and alloy wires—in either dry or wet operations — you can depend upon these important qualities in Procter & Gamble soaps:

Excellent Adherence
Efficient Lubrication
Minimum Dusting
Uniformity
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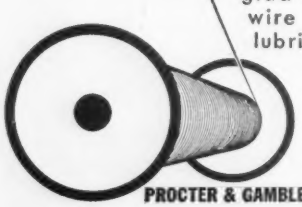
One of our representatives will be glad to discuss wire drawing lubricants with you.



PROCTER & GAMBLE, CINCINNATI

intervals by outside contractors. When a batch of material is ready for despatch the Warehouse Superintendent extracts from his records details of the weight, number of bundles and destination and arranges the preparation of the Advice Notes. These advice notes are made out in sets of four and are used as follows:—

One copy is sent with the material to the customer.

One copy is posted to the customer.

One copy is used to advise the Production Department of the despatch, to enable their records of material to be produced to be kept up-to-date.

* * *

THE last copy being sent to the Sales Department where it starts the whole operation of invoicing and the collection of money from the customers in payment for the material supplied.

* * *

Conclusion

FINALLY the Warehouse is the Department which holds stocks of finished material which is available for immediate despatch on receipt of an order for that particular quality. Generally speaking the present raw material shortages and the acute demand for finished material over the last few months has resulted in all stock lines being sold and no opportunity occurring for replacement. Consequently, stock storage and its attendant work of record keeping has been, and seems likely to be for some considerable time, only a minor part of the Warehouse work.

* * *

Wire Forms

(*Continued from page* 305)

ALTHOUGH slide motions are horizontal, it does not follow that bends are necessarily made only in horizontal planes. The end of any die can be so shaped as to throw the wire up or down or at any angle if the design of the part requires this. It is also possible to provide slide dies that will head, upset, shear, shape ends, pierce holes or slots or perform other

BORAX
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Wire Drawing

After pickling, BORAX can be applied with one dip; dries in three minutes in an oven temperature of 150° F. to provide a coating that will not check or flake off in storage. Dissolves readily in water and is dust free. BORAX, other than being an excellent vehicle for picking up the drawing lubricant, is rust inhibiting and a natural flux that will facilitate the making of good butt welds. Use BORAX to make better wire at less cost. Used in many mills.

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Phosphor Bronze } **WIRE FLAT**

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Belleville 9, New Jersey

operations such as might be done, for example, by dies in a stamping press.

* * *

IN addition, dies often include pins around which the wire is looped one or more times (after which the pin may be retracted, if necessary.) Dies are often provided also with other parts that are pivoted or arranged for some other motion relative to the supporting die body. Often, some part of one die operates a cam or other element of another die portion to produce special results. Occasionally, the stripping device is rigged to perform a secondary operation. By such means, it is possible to produce an infinite number of shapes and even to effect assemblies of certain types before the wire form is ejected from the machine.

* * *

SINCE each working element of the machine is actuated separately, though in timed relation, and the actuating element, usually a cam, can be altered in various ways or left inoperative, a wide range of changes can be made in setup. Hence the machine can be adapted to an infinite variety of work. Thus, to mention only one type of variation, the cutoff device can be left inoperative or be arranged to operate only once in any given number of cycles. When this is done, a series of duplicate operations can be performed on the same length of wire which is advanced a given distance between operations. Then the product can be fed out in continuous lengths, having, for example, a series of duplicate convolutions or "teeth" formed in various ways, as in some types of book binding wire forms, for example. Fig. 5 shows, at F, a partly formed length of this kind and, at B, a completely formed length cut from a continuous length. At G, the wire form is shown assembled to a form made from ribbon stock, ready for application to a loose leaf book.

* * *

CLEARLY, then, the wire forming machine, although it has limitations, is remarkably flexible in respect to the products it can make. If the die designer knows the machine and makes the most

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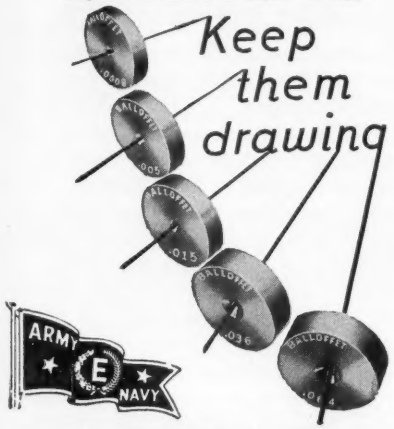
Large stock on hand of domestic and imported dies available for immediate shipment in sizes from .0004" to .081"



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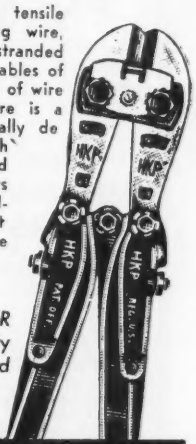

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of its possibilities, he can make it turn out parts that may appear truly marvels to those not familiar with what can be accomplished in wire forming.

* * *

ALTHOUGH it is desirable, from an efficiency standpoint, to have the wire form drop complete and ready for use from the forming machine, there are uncounted wire and ribbon products on which it is essential or desirable to perform supplementary operations, such for example, as welding ends together, chasing or tapping a thread, upsetting, flattening or performing some other forging operation too heavy for the forming machine or performing some type of assembly that it is not feasible to do in the forming machine or that is performed to better advantage in some other way.

* * *

STAMPING presses are often set up to perform secondary operations and sometimes are even equipped with magazine or other automatic feeds to minimize labor requirements. Other machines can be of conventional types but, especially for welding of parts needed in very large quantities, special machines are sometimes built to do the job automatically at high speed.

* * *

FOR each type of product, both the designer and the producer, if they are to secure optimum results, need to size up both the results required and the means by which they can be attained and adapt the product to the machine as well as the machine to the product. This more or less parallels what is needed in other types of items designed for quantity production but it often involves more factors than have to be weighed in certain other types of products.

* * *

NATURALLY, if a particular type of finish is essential, the designer as well as the producer must or should consider what is required in the way of a secondary operation to attain this finish. Often, the wire available has the finish wanted and, if processing (such as heat treating, severe forming or means used for burr removal, if any) does not injure this finish, extra finishing operations can be avoided.

* * *

IN other cases, if processing is severe, sheared surfaces must be protected or the desired finish is not available on the wire used anyway, some form of plating, enameling or other finish may have to be applied after forming and other working are completed. In that event, the problems of finishing more or less parallel those on many other types of product except that wire is likely to average somewhat smoother initially and commonly presents fewer sharp edges than many other products do. Many wire formed products are tumbled, partly to remove burrs, as a preliminary to finishing and, of course, barrel plating is often done on wire forms.

Part II will be published in the May, 1948 issue of WIRE & WIRE PRODUCTS

* * *

Labor Relations

(*Continued from page* 319)

good business, most management tacticians will prefer to go along on so-called "bootleg" labor agreements outside provisions of the Taft-Hartley law. This will avoid any lessening of production during this vital period. Legal experts are practically unanimous in the belief that there is nothing illegal about reaching an agreement with any union, regardless of whether it has complied with the Taft-Hartley law, so long as facilities of the Government are not called upon in the negotiations.

* * *

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Foreign Notes

EFFORTS to reorganize the Austrian wire industry have so far failed completely. The Russians have dismantled not only the wire works in the province of Niederoesterreich, but also in Styria. Under the Marshall-plan Austria should get the equivalent of 120 Million Dollars to rebuild her iron and steel industry and to reach in 1951 production figures of 1938 equivalent. It is however doubtfull whether this project can materialize. Steel production has declined from the peak of 37.000 tons monthly average in the spring of 1947 to 24.400 tons in October, 26.300 tons in November and 23.100 tons in December 1947. This is only 23% of what it was 1940. The production of wire rods has fallen below 1.000 tons monthly and of wire and wire products to below the 700 ton mark. The Austrian steel works rely to a great extent on scrap supplies and as all scrap deposits are still sequestrated production had to be curtailed.

* * *

CZECHOSLOVACHIA is offering wire nails at a price of $93.- per ton on fob basis to European countries, but very little business has as yet been booked. Practically the whole output of barbed wire in CSR is reserved for supplies to Russia in exchange for Russian products.

* * *

SWEDISH ship nails (wrought iron) of 4 to 8″ length are being offered at present at the basis of $102. per ton on fob basis.

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THE MALIN & CO.
2514 Vestry Ave., Cleveland 13, Ohio

Recently orders were booked from East Africa and India but the prewar volume of business has not yet been reached.

* * *

THE quantity of nails produced in Germany by handwork is rather considerable. Many of the small handworking enterprises of the early 19th century in the Remscheid-Hagen-Muenster area have been restarting operations. Due to the extraordinary high prices for nails, hand production pays better than machine production, because the wire nail mills cannot get new machinery or replace missing parts, but have to pay their staff in full. At present some 100 hand working wire nail mills are in operation with 2-10 employees. Raw material is gained from scrap yards, on the black market or other sources. In some cases Belgian businessmen smuggle wire nail wire into Germany and pay for the finished product with coffee and cigarettes, thereby buying at 50% less than for the manufactured products in Belgium.

* * *

OF the 18 wire and wire products plants, which formerly were in operation in Silesia (Germany), now Polish, not one is working, all of them had been dismantled and carried to Russia.

* * *

THE **JEIA** (Joint export-import agency) has permitted the export of 100 tons of wire strand 7 ply of ¼" strength, galvanized. It is the first order of this kind executed by a German mill and the price is 24.10 per ton fob. The buyer is Norway. Almost no other orders for wire products have been recently booked.

* * *

LUXEMBOURG produced 107.000 tons of wire rods in 1947 of which 92% were exported to Belgium, Holland, England and other countries.

* * *

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* * *

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* * *

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* * *

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* * *

SEND for Bulletin PC478, issued by **Photoswitch, Inc.**, 77 Broadway, Cambridge 42, Mass.

* * *

TYPICAL installations of unit type DUSTKOP dust collectors are illustrated and described in a 4 page bulletin #510 titled "Put a Permanent Stop to Dusts" issued by **Aget-Detroit Company**, Ann Arbor, Michigan.

* * *

DUST collectors for stopping dusts and lint from grinding, polishing and buffing operations as well as vapor collectors to trap the mist and vapor from thread included in centerless grinders are included in the bulletin, together with prices of the units.

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* * *

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* * *

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* * *

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* * *

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Scott Testers, Inc., Providence, R. I.

CLOTH—WIRE, All Metals
Roebling's, John A. Sons, Co., Trenton, N. J.
Wickwire Spencer Steel Division, Colorado Fuel & Iron Corp., Buffalo, N. Y.

COATING COMPOUNDS—
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co.. Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

COILERS—Sheet, Strip and Wire
Entwistle, Jas. L. Co., Pawtucket, R. I.
Morgan Construction Co., Worcester, Mass.
Laribee Machine Co., Inc., Camden, N. Y.
Ruesch, H. J. Machine Co., Newark, N. J.
Wean Equipment Corp., Cleveland, Ohio.

COLD HEADERS—
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

COMPOUNDS—Coppering
American Chemical Paint Co., Ambler, Pa.

COMPOUNDS—Diamond
Magnus Chemical Co., Garwood, N. J.
Union Wire Die Company, New York, N. Y.

COMPOUNDS—Metal Finishing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.

COMPOUNDS—Rust Preventing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Nopco Chemical Co., Harrison N. J.
Oakite Products, Inc., New York, N. Y.

COMPOUNDS—Rust Removing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

COMPOUNDS—Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Bick, Hans C., Inc., Reading, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H. Co., Inc., Homer, N. Y.
Nopco Chemical Co., Harrison N. J.
Oakite Products, Inc., New York, N. Y.
Pacific Coast Borax Corp., New York, N. Y.
Potter, Neil C., Newark, N. J.
Standard Industrial Compounds Co., Chicago, Ill.
Swift & Company, Chicago, Ill.

COPHOLDERS—Steel
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Wire & Textile Machinery Inc., Pawtucket, R.I.

CRANES—Wire Mill
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

CUTTING TOOLS—Carbide
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel & Carbide Co., McKeesport, Pa.
Metal Carbides Corporation, Youngstown, Ohio.
Rusch Wire Die Corp., Croton-on-the-Hudson, New York.
Vascoloy-Ramet Corp., North Chicago, Ill.
Willey's Carbide Tool Co., Detroit, Mich.

CUTTING TOOLS—Wire
Porter, H. K., Inc., Everett, Mass.

DIAMONDS—Industrial
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N.J.
Champion Diamond Co., New York, N. Y.
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Vianney Wire Die Wks., New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIAMOND POWDERS—
Champion Diamond Co., New York, N. Y.
New England Wire Die Co., Worcester, Mass.
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Union Wire Die Corp., New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIAMOND TOOLS—
Carboloy Co., Inc., Detroit, Mich.
Eastern Tungsten Carbide Co., Newark, N. J.
Firth Sterling Steel & Carbide Co., McKeesport, Pa.
Metal Carbides Corporation, Youngstown, Ohio.
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Wayne Wire Die Co., Hillside, N. J.

DIES—Cold Heading
Hoosier Carbide Die Co., Ft. Wayne, Ind.

DIES—Diamond
Ajax Industrial Supplies, Inc., Fort Wayne, Ind
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N.J.
Cochaud Wire Die Corp., New York, N. Y.
Ft. Wayne Wire Die, Inc., Fort Wayne, Ind.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
New England Wire Die Co., Worcester, Mass.
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Union Wire Die Corp., New York, N. Y.
Vianney Wire Die Wks., New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIES—Eyelet
Hoosier Carbide Die Co., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Rusch Wire Die Corp., Croton-on-the-Hudson, N. Y.
Union Wire Die Corp., New York, N. Y.

DIES—Lead Extrusion
Carboloy Co., Inc., Detroit, Mich.
Eastern Tungsten Carbide Co., Newark, N. J.
Firth Sterling Steel & Carbide Co., McKeesport, Pa.
Metal Carbides Corporation, Youngstown, Ohio.
Robertson, John, Co., Brooklyn, N. Y.

Wayne Wire Die Co., Hillside, N. J.
Willey's Carbide Tool Co., Detroit, Mich.

DIES—Repairs & Re-Cutting
Ajax Industrial Supplies Inc., Fort Wayne, Ind.
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N.J.
Carboloy Co., Detroit, Mich.
Cochaud Wire Die Corp., New York, N. Y.
Eastern Tungsten Carbide Co., Newark, N. J.
Firth-Sterling Steel & Carbide Co., McKeesport, Pa.
Ft. Wayne Wire Die, Inc., Fort Wayne, Ind.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
New England Wire Die Co., Worcester, Mass.
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Wks., New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.
Willey's Carbide Tool Co., Detroit, Mich.

DIES—Rod and Tube Drawing
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N.J.
Carboloy Co., Inc., Detroit, Mich.
Eastern Tungsten Carbide Co., Newark, N. J.
Firth-Sterling Steel & Carbide Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Wks., New York, N. Y.
Willey's Carbide Tool Co., Detroit, Mich.

DIES—Sintered Carbide
Hoosier Carbide Die Co., Ft. Wayne, Ind.

DIES—Special Shapes, Etc.
Hoosier Carbide Die Co., Ft. Wayne, Ind.

DIES—Tantalum Carbide
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N.J.
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel & Carbide Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, Ohio.
Rusch Wire Die Corp., Croton-on-the-Hudson, N.Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Wks., New York, N. Y.

DIES—Tubing
Hoosier Carbide Die Co., Ft. Wayne, Ind.

DIES—Tungsten Carbide
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N.J.
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel & Carbide Co., McKeesport, Pa.
Hoosier Carbide Die Co., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, Ohio.
Rusch Wire Die Corp. Croton-on-the-Hudson, N.Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Wks., New York, N. Y.
Wayne Wire Die Co., Hillside. N. J.
Willey's Carbide Tool Co., Detroit, Mich.

DRAW BENCHES—
(See MACHINERY—Draw Benches)

DRUMS—Flange Steel
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.

DRUMS—Vulcanizing
Mossberg Pressed Steel Corp., Attleboro. Mass.
Watson Machine Co., The, Paterson, N. J.

DRYING EQUIPMENT—
Carl-Mayer Corp., The. Cleveland, Ohio.
Industrial Ovens, Inc., Cleveland, Ohio.
Ross, J. O., Engineering Corp., New York, N.Y.

WHERE TO BUY, Continued

ENGINEERS—Consulting Wire Mill
Lewis, Kenneth B., Worcester, Mass.

EQUIPMENT—Insulation Testing
Davis, R. L., Elec. Co., Wallingford, Conn.
Entwistle, James L., Co., Pawtucket, R. I.

EYELETS—Brass or Zinc
Platt Bros., & Co., The, Waterbury, Conn.

FLUXES—Soldering
American Chemical Paint Co., Ambler, Pa.

FOAM PRODUCING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Parkin, Wm. M. Co., Pittsburgh, Pa.

FRICTION PAY-OFF STANDS—
Industrial Ovens, Inc., Cleveland, Ohio.

FURNACES—Annealing
Ajax Electric Co., Inc., Philadelphia, Pa.
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Hayes C. I., Providence, R. I.
Surface Combustion Corp., Toledo, Ohio.
Trauwood Engr. Co., Cleveland, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

FURNACES—Automatic
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Surface Combustion Corp., Toledo, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

FURNACES—Brazing
Electric Furnace Co., Salem, Ohio.
Firth-Sterling Steel & Carbide Co., McKeesport, Pa.

FURNACES—Bright Annealing
Electric Furnace Co., Salem, Ohio.
Furnace Engineers Inc., Pittsburgh, Pa.
Surface Combustion Corp., Toledo, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

FURNACES—Electric
Eisler Engineering Co., Newark, N. J.
Electric Furnace Co., Salem, Ohio.
Hayes, C. I., Providence, R. I.
Surface Combustion Corp., Toledo, Ohio.
Trauwood Engineering Co., The, Cleveland, Ohio

FURNACES—Galvanizing Equipment
Ajax Electric Co., Inc., Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Surface Combustion Corp., Toledo, Ohio.
Trauwood Engineering Co., The, Cleveland, Ohio
Wilson, Lee, Engr. Co., Cleveland, Ohio.

FURNACES—Hard'ing & Temp'ing
Ajax Electric Co., Inc., Philadelphia, Pa.
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Surface Combustion Corp., Toledo, Ohio.
Trauwood Engr. Co., The, Cleveland, Ohio.

FURNACES—Lead Melting
Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Robertson, John, Co., Brooklyn, N. Y.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Non-Oxidizing
Ajax Electric Co., Inc., Philadelphia, Pa.
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Normalizing
Ajax Electric Co., Inc., Philadelphia, Pa.
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Pot (Oil, Gas, Electric)
Ajax Electric Co., Inc., Philadelphia, Pa.

FURNACES—Salt Bath
Ajax Electric Co., Inc., Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio.
Surface Combustion Corporation, Toledo, O.
Trauwood Engineering Co., The, Cleveland, Ohio

FURNACES—Wire, Strip & Sheet
Carl-Mayer Corp., The, Cleveland, Ohio.
Eisler Engineering Co., Newark, N. J.
Electric Furnace Co., Salem, Ohio.
Furnace Engineers, Inc., Pittsburgh, Pa.
Surface Combustion Corporation, Toledo, O.
Trauwood Engineering Co., The, Cleveland, Ohio
Wilson, Lee, Engr. Co., Cleveland, Ohio.

GALVANIZING ENGINEER—Consulting
Spowers, W. H., Jr., New York, N. Y.

GALVANIZING EQUIPMENT—
Hanson-Van Winkle-Munning Co., Matawan, N.J.
Steel Equipment Co., Cleveland, Ohio.
Wean Equipment Corp., Cleveland, Ohio.

GAVANIZING FLUXES—
Hanson-Van Winkle-Munning Co., Matawan, N.J.

GALVANIZING KETTLES—
National Annealing Box Co., Washington, Penna.

GRINDERS—Roll
Norton Co., The, Worcester, Mass.

HOISTS—Electric Travelling
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, Ohio.

INHIBITORS—Pickling
American Chemical Paint Co., Ambler, Pa.
Oakite Products, Inc., New York, N. Y.
Parkin, Wm. M. Co., Pittsburgh, Pa.

INSULATING LACQUERING SYSTEMS—Continuous
American Insulating Machine Co., Phila., Pa.
Industrial Ovens, Inc., Cleveland, Ohio.

INSULATING MATERIALS—
Du Pont de Nemours, E. I., Co., Wilmington, Del.
General Electric Co., Schenectady, N. Y.
Martin Glenn L. Company, Baltimore, Md.
Owens Corning Fiberglas Corp., Toledo, O.
Standard Varnish Wks., Staten Island, N. Y.
Twitchell, E. W., Philadelphia, Pa.
Warren Thread Works, Inc., W. New York, N.Y.

LATHES—Die Reaming
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel & Carbide Co., McKeesport, Pa.
Morgan Construction Co., Worcester, Mass.
Roos, H. & G., Tool & Mfg. Co., Montclair, N.J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Machine Co., Waterbury, Conn.

LIME—
Warner Co., Philadelphia and Bellefonte, Pa.

LININGS—Acid and Alkali Proof
Ceilcote Co., The, Cleveland, Ohio.
Haveg Corp., Newark, Del.
Sauereisen Cements Co., Pittsburgh, Pa.

LUBRICANTS—For Metal Cutting, Stamping and Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

LUBRICANTS—Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Bick, Hans C., Inc., Reading, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Potter, Neil C., Newark, N. J.
Standard Industrial Compounds Co., Chicago, Ill.
Swift & Company, Chicago, Ill.

MACHINERY—Armoring (Cable, Wire Hose)
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Braiding
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Wire & Textile Mach'y, Inc., Pawtucket, R. I.

MACHINERY—Brazing
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Bunching
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire & Textile Machinery, Inc., Pawtucket, R.I.

MACHINERY—Bundling, Scrap
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Cable, Electric
American Insulating Mach'y Co., Phila., Pa.
Laribee Machine Co., Inc., Camden, N. Y.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Chain Making
Nilson, A. H. Machine Co., The, Bridgeport, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Cable, Rope Closing
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Coil Winding
Entwistle, Jas. L. Co., Pawtucket, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Coilers
Eisler Engineering Co., Newark, N. J.
Entwistle, Jas. L. Co., Pawtucket, R. I.
Laribee Machine Co., Inc., Camden, N. Y.
Morgan Construction Co., Worcester, Mass.
National Machinery Exchange (used), New York, N. Y.
New England Butt Co., Providence, R. I.
Ruesch, H. J. Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Waterbury Farrel Fdry. & Mach. Co., Waterbury, Conn.
Watson Machine Co., Paterson, N. J.
Wean Equipment Corp., Cleveland, Ohio.
Wire & Textile Machinery Inc., Pawtucket, R. I.

MACHINERY—Copper Wire Drawing and Rolling
Aetna Standard Eng'g Co., The, Youngstown, O.
American Insulating Mach'y Co., Phila., Pa.
Laribee Machine Co., Inc., Camden, N. Y.
National Machinery Exchange (used), New York, N. Y.
Ruesch, H. J., Machine Co., Newark, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Covering Wire
American Insulating Mach'y Co., Phila., Pa.
National Rubber Machinery Co., Akron, Ohio
National Erie Corp., Erie, Pa.
New England Butt Co., Providence, R. I.
Royle, John & Sons, Paterson, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Cutting
Eisler Engineering Co., Newark, N. J.
Lewis Machine Co., The, Cleveland, Ohio.
National Mach'y Exch. (Used), New York, N.Y.
Nilson Machine Co., A. H., Bridgeport, Conn.
Porter, H. K. Inc., Everett, Mass.
Shuster, F. B. Mfg. Co., New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Die Making
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel & Carbide Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Roos, H. & G., Tool & Mfg. Co., Montclair, N.J.
Union Wire Die Corp., New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.

MACHINERY—Draw Benches
Aetna Standard Eng'g Co., The, Youngstown, O.
Morgan Construction Co., Worcester, Mass.
Ruesch, H. J., Machine Co., Newark, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Edging
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Enameling
American Insulating Mach'y Co., Phila., Pa.
Industrial Ovens, Inc., Cleveland, Ohio.
Laribee Machine Co., Inc., Camden, N. Y.
Syncro Machine Co., Perth Amboy, N. J.

WHERE TO BUY, Continued

MACHINERY—Extruding
National Erie Corp., Erie, Pa.
National Rubber Machinery Co., Akron, Ohio.
Robertson John, Co., Brooklyn, N. Y.
Royle, John, & Sons, Paterson, N. J.
Wire & Textile Machinery, Inc., Pawtucket, R. I

MACHINERY—Fence
Glader, Wm., Machine Works, Chicago, Ill.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Filament Coil Winding
Eisler Engineering Co., Newark, N. J.

MACHINERY—Flat Wire
Ruesch, H. J., Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Wire Forming
Eisler Engineering Co., Newark, N. J.
National Mach'y Exch. (Used), New York, N.Y.
Nilson Machine Co., A. H., Bridgeport, Conn.
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Galvanizing
(See Galvanizing Equipment)

MACHINERY—Galvanizing Wire
Sleeper & Hartley, Inc., Worcester, Mass.
Steel Equipment Co., Cleveland, Ohio.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio.

MACHINERY—Gang Winders
Entwistle, Jas. L. Co., Pawtucket, R. I.
Ruesch, H. J., Machine Co., Newark, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Grinding
Norton Co., The, Worcester, Mass.

MACHINERY—Insulating
American Insulating Mach'y Co., Phila., Pa.
National Erie Corp., Erie, Pa.
National Rubber Machinery Co., Akron, Ohio.
New England Butt Co., Providence, R. I.
Royle, John & Sons, Paterson, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Lead Encasing Presses, etc.
Robertson, John Co., Brooklyn, N. Y.

MACHINERY—Lead Stripping
Robertson, John Co., Brooklyn, N. Y.

MACHINERY—Lock Washer
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Magnet Wire
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Material Handling
Cleveland Tramrail, Div. of The Cleveland Crane & Engineering Co., Wickliffe, O.

MACHINERY—Measuring Wire & Cable
Durant Mfg. Co., Milwaukee, Wis.
Entwistle, Jas. L. Co., Pawtucket, R. I.
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Nail and Tack
Glader, Wm., Machine Works, Chicago, Ill.
National Mach'y Exch. (Used), New York, N.Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Panning
American Insulating Mach'y Co., Phila., Pa.
Syncro Machine Co., Perth Amboy, N. J.
Wire & Textile Machinery, Inc., Pawtucket, R.I.

MACHINERY—Plating Electrolytic
Hanson-Van Winkle-Munning Co., Matawan, N.J.

MACHINERY—Pointing
Aetna Standard Eng'g Co., The, Youngstown, O.
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N.Y.
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J., Fdry & Mach. Co., Trenton, N.J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Rod Mill
Morgan Construction Co., Worcester, Mass.
Ruesch, H. J., Machine Co., Newark, N. J.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Rolling Mill
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N.Y.
Ruesch, H. J., Machine Co., Newark, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Rubber Insulating
National Rubber Machinery Co., Akron, O.
Royle, John & Sons, Paterson, N. J.
Wire & Textile Machinery, Inc., Pawtucket, R. I.

MACHINERY—Rubber Tubing and Straining
National Rubber Machinery Co., Akron, O.
New England Butt Co., Providence, R. I.
Royle, John & Sons, Paterson, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Wire & Textile Machinery, Inc., Pawtucket, R.I.

MACHINERY—Screw Wire
National Mach'y Exch. (Used), New York, N.Y.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Special
American Insulating Mach'y Co., Phila., Pa.
Emory, Robert J., Co., Newark, N. J.
Entwistle, Jas. L. Co., Pawtucket, R. I.
National Erie Corporation, Erie, Pa.
New England Butt Co., Providence, R. I.
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J., Fdry & Mach. Co., Trenton, N.J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Spooling
American Insulating Mach'y Co., Phila., Pa.
Eisler Engineering Co., Newark, N. J.
Emory, Robert J., Co., Newark, N. J.
Entwistle, Jas. L. Co., Pawtucket, R. I.
Laribee Machine Co., Inc., Camden, N. Y.
National Mach'y Exch. (Used), New York, N.Y.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Steel Equipment Co., Cleveland, Ohio.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O. Waterbury, Conn.
Watson Machine Co., Paterson, N. J.
Wean Equipment Corp., Cleveland, Ohio.
Wire & Textile Mach'y, Inc., Pawtucket, R. I.

MACHINERY—Spring Making
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Staple
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Straightening
Lewis Machine Co., The, Cleveland, Ohio.
National Mach'y Exch. (Used), New York, N.Y.
Nilson, A. H. Machine Co., Bridgeport, Conn.
Ruesch, H. J., Machine Co., Newark, N. J.
Shuster, F. B., Mfg. Co., New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Stranding
Hughesville Machine & Tool Co., Hughesville, Pa.
Laribee Machine Co., Inc., Camden, N. Y.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Strip Steel
Ruesch, H. J., Machine Co., Newark, N. J.
Steel Equipment Co., Cleveland, Ohio.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Swaging
National Erie Corp., Erie, Pa.
National Mach'y Exch. (Used), New York, N.Y.
Ruesch, H. J., Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Taping
American Insulating Mach'y Co., Phila., Pa.
Laribee Machine Co., Inc., Camden, N. Y.
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire & Textile Machinery, Inc., Pawtucket, R.I.

MACHINERY—Testing Physical
American Optical Co., Buffalo, N. Y.
Harrington Engineering Co., New York, N. Y.

MACHINERY—Testing Equipment—Sparkers
Davis, R. L. Elec. Co., Wallingford, Conn.
Entwistle, Jas. L., Pawtucket, R. I.
Scott Testers, Inc., Providence, R. I.
Wire & Textile Machinery, Inc., Pawtucket, R.I.

MACHINERY—Tinning Wire
American Insulating Mach'y Co., Phila., Pa.
Laribee Machine Co., Inc., Camden, N. Y.
New England Butt Co., Providence, R. I.
Steel Equipment Co., Cleveland, Ohio.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Tinsel Rolling Mills
American Insulating Mach'y Co., Phila, Pa.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Trolley Wire
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube Mill
National Erie Corp., Erie, Pa.
Ruesch, H. J., Machine Co., Newark, N. J.

MACHINERY—Welding Wire
Eisler Engineering Co., Newark, N. J.
Micro Products Co., Chicago, Ill.
Syncro Machine Co., Perth Amboy, N. J.

MACHINERY—Winding
American Insulating Mach'y Co., Phila, Pa.
Eisler Engineering Co., Newark, N. J.
Laribee Machine Co., Inc., Camden, N. Y.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wind-up (Constant Tension, Variable Speed)
Aetna Standard Eng'g Co., The, Youngstown, O.
Industrial Ovens, Inc., Cleveland, Ohio.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wire Bending
Eisler Engineering Co., Newark, N. J.
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.

MACHINERY—Wire Drawing
Aetna Standard Eng'g Co., The, Youngstown, O.
American Insulating Mach'y Co., Phila., Pa.
Eisler Engineering Co., Newark, N. J.
Laribee Machine Co., Inc., Camden, N. Y.
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N.Y.
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Steel Equipment Co., Cleveland, Ohio
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio.

MACHINERY—Wire Rope
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wood Screw
National Mach'y Exch. (Used), New York, N.Y.

MATERIAL HANDLING EQUIPMENT
Cleveland Tramrail, Div. of The Cleveland Crane & Engineering Co., Wickliffe, O.

NAILS—Wire
American Steel & Wire Co., Cleveland, Chicago, New York.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco, Calif.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Roebling, John A. Sons Co., Trenton, N. J.
Wickwire-Spencer Steel Division of Colorado Fuel & Iron Corp., Buffalo, N. Y.
U. S. Steel Export Co., New York, N. Y.

NICKEL SILVER AND PHOSPHOR BRONZE—Rod, Wire and Strip
Chase Brass & Copper Co., Waterbury, Conn.
Eastwood-Nealley Corp., Belleville, N. J.
Hudson Wire Co., Ossining, N. Y.

WHERE TO BUY, Continued

OPTICAL EQUIPMENT—Metallurgical
American Optical Co., Buffalo, N. Y.

OVENS—Cable Lacquering
American Insulating Mach'y Co., Phila., Pa.
Industrial Ovens, Inc., Cleveland, Ohio.

OVENS—Dehydrogenizing
Carl-Mayer Corp., The, Cleveland, Ohio.
Industrial Ovens, Inc., Cleveland, Ohio.

OVENS—Industrial
Carl-Mayer Corp., The, Cleveland, Ohio.
Industrial Ovens, Inc., Cleveland, Ohio.
Ross, J. O., Engr. Corp., New York, N. Y.

OVENS—Welding Rod Coating
Carl-Mayer Corp., The, Cleveland, Ohio
Industrial Ovens, Inc., Cleveland, Ohio.
Ross, J. O., Engr. Corp., New York, N. Y.

PAINTS—Heat Resisting
American Chemical Paint Co., Ambler, Pa.

PANS—Lead and Spelter
National Annealing Box Co., Washington, Penna.

PANS—Vulcanizing
Mossberg Pressed Steel Corp., Attleboro, Mass.

PAPER—Creped Wrapping
Crepe-Kraft Co., Newark, N. J.

PAPER—For Coil Wrapping and Corrosion Prevention
Crepe-Kraft Co., Newark, N. J.

PAPER TESTERS—
Scott Testers, Inc., Providence, R. I.

PATENT ATTORNEYS—
Lancaster, Allwine and Rommel, Washington, D.C.

PICKLING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Oakite Products, Inc., New York, N. Y.
Parkin, Wm. M., Co., Pittsburgh, Pa.

PICKLING—Hooks, etc. Acid Resisting
Gordon, Clark E., Detroit, Mich.

PICKLING TANK LININGS—
Ceilcote Co., The, Cleveland, Ohio.
Haveg Corp., Newark, Del.
Sauereisen Cements Co., Pittsburgh, Pa.

PIPES & FITTINGS—Acid Resistant
Ceilcote, Co., The, Cleveland, Ohio.
Haveg Corp., Newark, Del.

PLASTIC TESTERS—
Scott Testers, Inc., Providence, R. I

PLATING PROCESS—Electrolytic
Hanson-Van Winkle-Munning Co., Matawan, N.J.

POTS—Lacquer
Industrial Ovens, Inc., Cleveland, Ohio

POTS—Lead Melting
National Annealing Box Co., Washington, Pa.
Robertson, John, Co., Brooklyn, N. Y.

POWDER—Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Potter, Neil C., Newark, N. J.
Standard Industrial Compounds Co., Chicago, Ill.

PRESSES—Hydraulic and Mechanical
Robertson, John, Co., Brooklyn, N. Y.

PRESSES—Lead
Robertson, John, Co., Brooklyn, N. Y.

PRESSURE VESSELS—
National Annealing Box Co., Washington, Penna.

PULLERS—Wire
Scudder, E. J., Fdrv. & Mach. Co., Trenton, N.J.
Sleeper & Hartley, Inc., Worcester, Mass.

PUMPS—Hydraulic
Robertson, John, Co., Brooklyn, N. Y.

REEL AND TENSION STANDS—
Davis, R. L. Electric Co., Wallingford, Conn.
Entwistle, James L., Co., Pawtucket, R. I.
Industrial Ovens, Inc., Cleveland, Ohio.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

REEL CRUTCHES—
Watson Machine Co., Paterson, N. J.

REELS—Annealing and Stranding
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Laribee Machine Co., Inc., Camden, N. Y.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

REELS—Collapsible
Entwistle, Jas. L. Co., Pawtucket, R. I.

REELS—Steel
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Laribee Machine Co., Inc., Camden, N. Y.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

REELS AND SPOOLS—Shipping and Shop
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Bridge Mfg., Co., The, Hazardville, Conn.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Laribee Machine Co., Inc., Camden, N. Y.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

REELS—Takeoff
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Bridge Mfg. Co., Hazardville, Conn.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Laribee Machine Co., Inc., Camden, N. Y.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Shuster, F. B., Mfg. Co., New Haven, Conn.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

REELS—Vulcanizing & Impregnating
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

REELS—Wire Drawing
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Laribee Machine Co., Inc., Camden, N. Y.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

REELS—Wire Mill
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Bridge Mfg. Co., Hazardville, Conn.
Durkee Mfg. Co., Pine River, Minn.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Laribee Machine Co., Inc., Camden, N. Y.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Shuster, F. B., Mfg. Co., New Haven, Conn.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

REELS—Wooden
Acrometal Products, Inc., Minneapolis, Minn.
Bridge Mfg. Co., Inc., The, Hazardville, Conn.
Durkee Mfg. Co., Pine River, Minn.
Nelson Company, The, Baltimore, Ind.

REFRACTORIES—High Temperature
Norton Company, Worcester, Mass.

RESISTANCE HEATING—Annealing, Patenting, Etc.
Trauwood Engr. Co., Cleveland, Ohio.

ROD BAKERS—
Carl-Mayer Corp., The, Cleveland, Ohio.
Ross, J. O., Engineering Corp., New York, N.Y.

RODS—Nickel Alloy
Eastwood-Nealley Corp., Belleville, N. J.
International Nickel Co., Inc., New York, N.Y.

RODS—Stainless Steel
American Rolling Mill Co., The, Middletown, O.

RODS—Wire—Non-Ferrous
Eastwood-Nealley Corp., Belleville, N. J.
Hudson Wire Co., Ossining, N. Y.
Platt Bros. & Co., The, Waterbury, Conn.

RODS—Wire, Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Indiana.
Keystone Steel & Wire Co., Peoria, Ill.
Roebling's John A., Sons Co., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, O.

ROPE—Wire
American Steel & Wire Company, Cleveland, Chicago, New York.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco, Calif.
Roebling's, John A., Sons Co., Trenton, N. J.
U. S. Steel Export Co., New York, N. Y.
Wickwire-Spencer Steel, Division of Colorado Fuel & Iron Corp., Buffalo, N. Y.

RUBBER AND RUBBER COMPRESSION TESTERS—
Scott Testers, Inc., Providence, R. I.

RUST PROOF COMPOUNDS—
(See Compounds—Rust Preventing)

RUST REMOVING COMPOUNDS—
(See Compounds—Rust Preventing)

SATURATION SYSTEMS—
Industrial Ovens, Inc., Cleveland, Ohio.
Watson Machine Co., Paterson, N. J.
Wire & Textile Machy, Inc. Pawtucket, R. I.

SHEARS—
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.

SHEET—Steel
American Rolling Mill, Middletown, Ohio.
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Roebling's, John A., Sons Co., Trenton, N. J.
Wickwire-Spencer Steel Division of Colorado Fuel & Iron Corp., Buffalo, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

SOAPS—Industrial and Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Bick, Hans C., Inc., Reading, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H. Co., Inc., Homer, N. Y.
Nopco Chemical Co., Harrison N. J.
Potter, Neil C., Newark, N. J.
Procter & Gamble, Cincinnati, Ohio.
Swift & Company, Chicago, Ill.

SOLVENT RESIN SYSTEMS—Experimental
Industrial Ovens, Inc., Cleveland, Ohio.

SPOOLS—Annealing and Wire Drawing
Acrometals Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Howsam Spool Company, Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Laribee Machine Co., Inc., Camden, N. Y.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

SPOOLS—Shipping and Shop
Acrometals Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Clark Mfg. Co., J. L., Rockford, Ill.
Howsam Spool Company, Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Laribee Machine Co., Inc., Camden, N. Y.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp.,

SPOOLS—Steel
Acrometals Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Clark Mfg. Co., J. L., Rockford, Ill.
Howsam Spool Company, Aurora, Ill.
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

STAMPINGS—Steel
Hubbard Spool Company, Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.

STRIP—Brass and Non-Ferrous
Chase Brass & Copper, The Waterbury, Conn.
Hudson Wire Co., Ossining, N. Y.

STRIP—Steel
American Rolling Mill Co., The, Middletown, O.
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel & Carbide Co., McKeesport, Pa.
Roebling's, John A., Sons Co., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, O.

SWIFTS—Take-off
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Watson Machine Co., Paterson, N. J.

WHERE TO BUY, Continued

TANK LININGS—Brick
Ceilcote Co., The, Cleveland, Ohio.

TANK—Compound
Haveg Corp., Newark, Del.
Watson Machine Co., Paterson, N. J.

TANKS—Pickling
Ceilcote Co., The, Cleveland, Ohio.
Haveg Corp., Newark, Del.
Sauereisen Cements Co., Pittsburgh, Pa.

TANKS—Steel
Mossberg Pressed Steel Corp., Attleboro, Mass.
National Annealing Box Co., Washington, Penna.

TINSEL—Cords, Decorative
Hudson Wire Co., Ossining, N. Y.
Montgomery Co., The, Windsor Locks, Conn.
North American Philips Co., Inc., New York, N.Y.

TINSEL—Electric Conductor
Hudson Wire Co., Ossining, N. Y.
Montgomery Co., The, Windsor Locks, Conn.
North American Philips Co., Inc., New York, N.Y.

TINSEL—Electric Resistance
Hudson Wire Co., Ossining, N. Y.
Montgomery Co., The, Windsor Locks, Conn.
North American Philips Co., Inc., New York, N.Y.

TINSEL—Lame, Silver and False Gold
Hudson Wire Co., Ossining, N. Y.
Montgomery Co., The, Windsor Locks, Conn.
North American Philips Co., Inc., New York, N.Y.

TINSEL—Thread, Silver and False Gold
Hudson Wire Co., Ossining, N. Y.
Montgomery Co., The, Windsor Locks, Conn.
North American Philips Co., Inc., New York, N.Y.

TINSEL—Thread, Decorative
Hudson Wire Co., Ossining, N. Y.
Montgomery Co., The, Windsor Locks, Conn.
North American Philips Co., Inc., New York, N.Y.

TOOLS—Wire Cutting
Porter, H. K., Inc., Everett, Mass.

TRAMRAIL SYSTEMS—
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.

TRAVERSES—For Reels
Entwistle, James L. Co., Pawtucket, R. I.
Hubbard Spool Company, Chicago, Ill.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.

TRAVERSE MECHANISMS—
Apco Mossberg Co., Attleboro, Mass.
Laribee Machine Co., Inc., Camden, N. Y.
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Niles Steel Products Div., Republic Steel Corp., Niles, Ohio.
Watson Machine Co., Paterson, N. J.
Wire & Textile Machy. Inc. Pawtucket. R. I.

TUBE BENDERS AND FORMERS—
O'Neil-Irwin Mfg. Co., Lake City, Minn.
Ruesch, H. J. Machine Co., Newark, N. J.

VALVES AND FITTINGS—Acid Resistant
Haveg Corp., Newark, Del.

VARNISHES—For Insulation
General Electric Co., Schenectady, N. Y.
Standard Varnish Wks., Staten Island, N. Y.

VULCANIZERS—
Watson Machine Co., Paterson, N. J.

VULCANIZING PANS—
American Insulating Mach'y Co., Phila., Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.

WELDERS—Spot and Butt
Eisler Engineering Co., Newark, N. J.
Micro Products Co., Chicago, Ill.
Sciaky Bros., Inc., Chicago, Ill.

WIND-UP AND UNWIND SYSTEMS—Continuous
American Insulating Mach'y. Co., Phila., Pa.
Davis, R. L. Electric Co., Wallingford, Conn.
Entwistle, James L., Co., Pawtucket, R. I.
Industrial Ovens, Inc., Cleveland, Ohio.
Watson Machine Co., Paterson, N. J.
Wire & Textile Machy, Inc. Pawtucket, R. I.

WIRE—Aluminum
Aluminum Co. of America, Pittsburgh, Pa.
Malin & Co., Cleveland, Ohio.

WIRE—Cast
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Cold Heading
American Rolling Mill Co., The, Middletown, O.
American Steel & Wire Co., Cleveland-Chicago, New York.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco, Calif.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Roebling's John A., Sons Co., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Electric
Chase Brass & Copper, The, Waterbury, Conn.
Hudson Wire Co., Ossining, N. Y.
Malin & Co., Cleveland, Ohio.

WIRE—Enameled for Coils
North American Philips Co., Inc., New York, N.Y.
Winsted Div. of Hudson Wire Co., Winsted, Conn.

WIRE—Manufacturers
American Rolling Mill Co., The, Middletown, O.
American Steel & Wire Co., Cleveland-Chicago & New York.
Bethlehem Steel Co., Bethlehem, Pa.
Chase Brass & Copper, The, Waterbury, Conn.
Columbia Steel Co., San Francisco, Calif.
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel & Carbide Co., McKeesport, Pa.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Keystone Steel & Wire Co., Peoria, Ill.
Roebling's, John A., Sons Co., Trenton, N. J.
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
U. S. Steel Export Co., New York, N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Spencer Steel Div., of Colorado Fuel & Iron Corp., Buffalo, N.Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Nickel & Nickel Alloy
Eastwood-Nealley Corp., Belleville, N. J.
International Nickel Co., Inc., New York, N. Y.

WIRE—Music
American Steel & Wire Co., Cleveland,Chicago-New York.
Columbia Steel Co., San Francisco, Calif.
Ecca Machine Corp., New York, N. Y.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Malin & Co., Cleveland, Ohio.
Paramount Wire Co., 100 Bleecker St., New York. N. Y.
U. S. Steel Export Co., New York, N. Y.
Wickwire-Spencer Steel Division of Colorado Fuel & Iron Corp., Buffalo, N. Y.

WIRE—Nickel Silver and Phosphor Bronze
Chase Brass & Copper, The, Waterbury, Conn.
Eastwood-Nealley Corp., Belleville, N. J.
Hudson Wire Co., Ossining, N. Y.
Malin & Co., Cleveland, Ohio.

WIRE—Non-Ferrous to Specification for Special Purposes
Anchor Wire Corp., Jamaica, N. Y.
Chase Brass & Copper, The, Waterbury, Conn.
Eastwood-Nealley Corp., Belleville, N. J.
Hudson Wire Co., Ossining, N. Y.
North American Philips Co., Inc., New York, N.Y.
Paramount Wire Co., 100 Bleecker St., New York, N. Y.
Winsted Div. of Hudson Wire Co., Winsted, Conn.

WIRESERVING—Paper and Cotton
Paramount Wire Co., 100 Bleecker St., New York, N. Y.

WIRE—Spring
American Rolling Mill Co., The, Middletown, O.
American Steel & Wire Co., Cleveland - Chicago - New York
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco, Calif.
Continental Steel Corp., Kokomo, Indiana.
Firth-Sterling Steel & Carbide Co., McKeesport, Pa.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Keystone Steel & Wire Co., Peoria. Ill.
U. S. Steel Export Co., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Stainless Steel
American Rolling Mill Co., The, Middletown, O.
American Steel & Wire Co., Cleveland-Chicago-New York.
Columbia Steel Co., San Francisco, Calif.
Firth-Sterling Steel & Carbide Co., McKeesport, Pa.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
U. S. Steel Export Co., New York, N. Y.

WIRE—Steel—Also Coppered Steel—Also Galvanized Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Indiana.
Firth-Sterling Steel & Carbide Co., McKeesport, Pa.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Keystone Steel & Wire Co., Peoria, Ill.
Paramount Wire Co., 100 Bleecker St., New York. N. Y.
U. S. Steel Export Co., New York, N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Straightening and Cutting—
Pittsburgh Cut Wire Co., Pittsburgh, Pa.

WIRE—Zinc
Platt Bros. & Co., The, Waterbury, Conn.

WIRE CLOTH—Industrial
Roebling's John A., Sons Co., Trenton, N. J.
Wickwire Brothers, Cortland, N. Y.
Wickwire-Spencer Steel Division of Colorado Fuel & Iron Corp., Buffalo, N. Y.

WIRE TESTERS—
Scott Testers, Inc., Providence, R. I.

WIRE, WEAVING—Non-Ferrous
Hudson Wire Co., Ossining, N. Y.

WRAPPING PAPER—Creped
Crepe-Kraft Co., Newark, N. J.

YARNS & TAPES—
Du Pont de Nemours, E. I., Co., Wilmington, Del.
General Electric Co., Schenectady, N. Y.
Owens Corning Fiberglas Corp., Toledo, Ohio.
Twitchell, E. W., Philadelphia, Pa.
Warren Thread Works, Inc., W., New York, N.Y.

YARN TESTERS—
Scott Testers, Inc., Providence, R. I.

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ESTABLISHED 1845

PATERSON 3, NEW JERSEY, U. S. A.

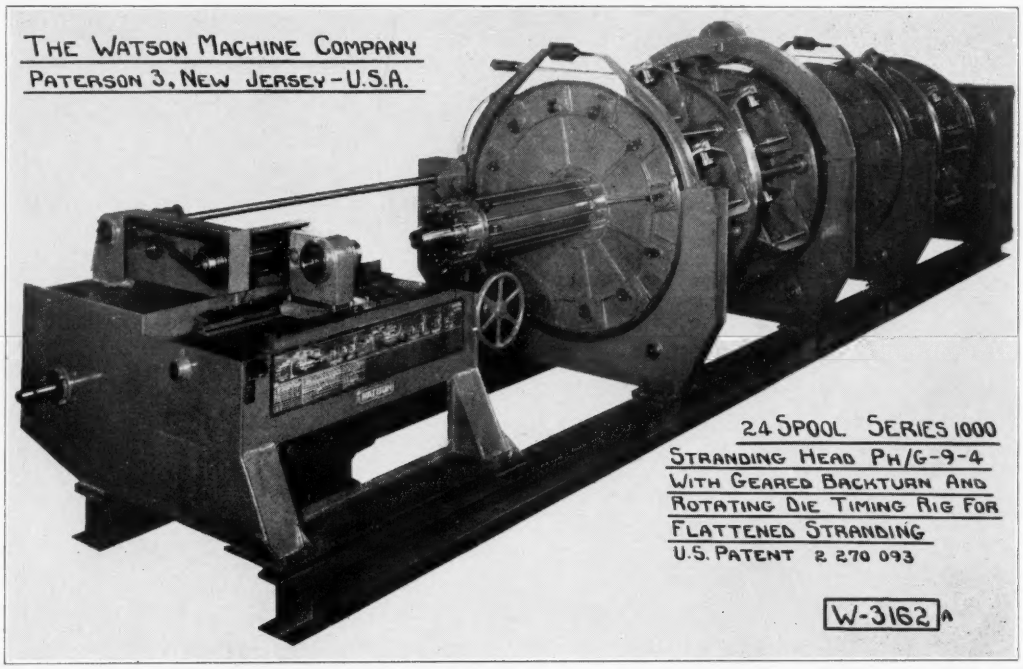
Wire & Wire Products

April, 1948

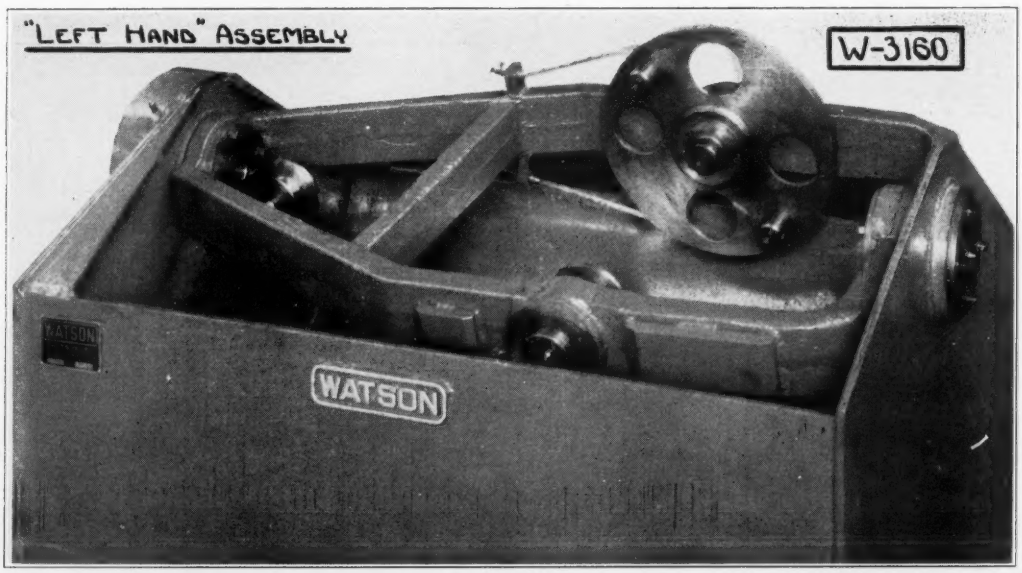
ELECTRICAL WIRE AND CABLE AND WIRE ROPE MACHINERY

PLANETARY STRANDERS — SERIES 1000

U.S. PATENT 2.270.093

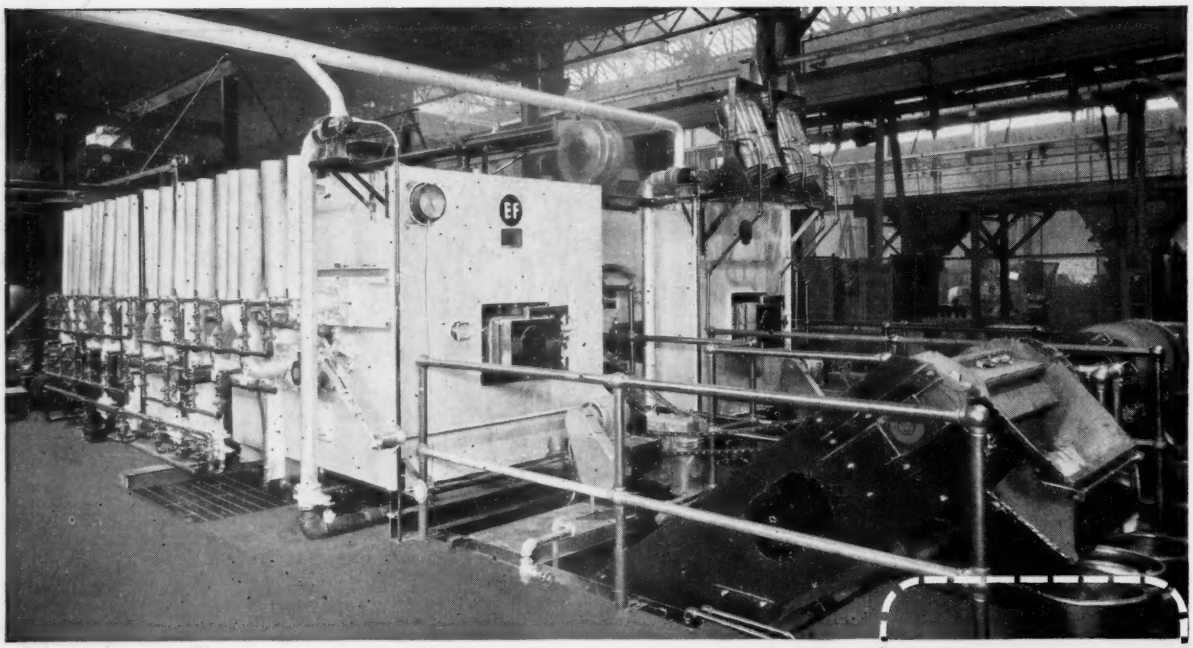


Built as Integral Units All Mounted on Single Base, with Flat, Retracting-Pintle, Anti-Slap, Integral-Tension, variable Gear-Backturn Cradles. All steel Speed-Change-Reverse Gearing In Enclosed Head Stand. Fully Anti-Friction Bearing. Automatic Rapid Acting "Air-Off" Brakes. Eccentric Adjustable Rotor Support Rollers. Reversible Rotating Die Holder with variable Timing Train and Rotating Core Cradle Units (See Cut Below) Provided When Specified.



EF

STANDARD DESIGNS OF CHAIN BELT FURNACES



FOR THE LOW COST HEAT TREATMENT OF SMALL AND MEDIUM SIZE PARTS

● EF Chain Belt Furnaces, see view above, are the most satisfactory continuous heat treating equipment yet devised for carbon restoration, scale free hardening and hardening without decarburization of small and medium size parts. The material is loaded directly onto the EF continuous heat resisting cast link conveyor belt—and is conveyed automatically into the furnace—treated uniformly in the special controlled atmosphere produced in an EF generator,—discharged through a sealed chute into continuous quenching equipment—and either carried on through washing equipment and draw furnace—or passed directly into tote boxes as desired. These furnaces are built in standard sizes, for capacities up to 2000 lbs. per hour. Special designs to meet any requirement. Estimates of equipment, installation, and operating costs—and samples of treated parts—furnished promptly. Write for descriptive catalog.

Bolts **Pinions**
Chains **Rivets**
Gears **Screws**
Engine Parts
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Tools
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...and a wide variety of other forged, drawn, stamped, machined, headed and welded parts

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